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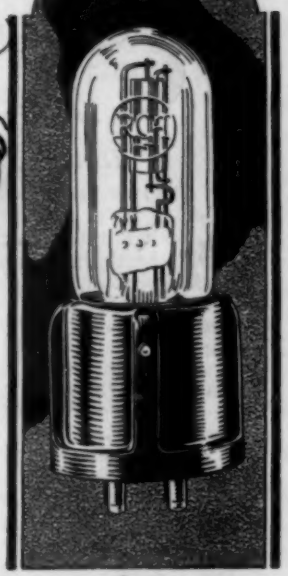

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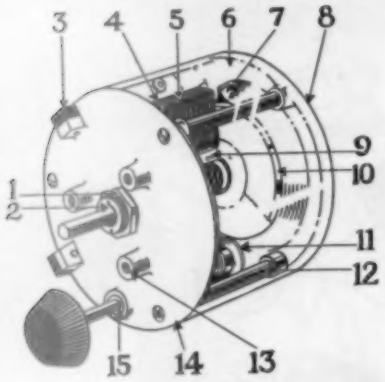

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QST

The Official Organ of the A·R·R·L

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THE AMERICAN RADIO RELAY LEAGUE

The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its Board.

"Of, by and for the amateur", it numbers within its ranks practically every worth-while amateur in North America and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisites. Correspondence should be addressed to the Secretary.

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SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

EDITORIALS

This Interference Business

IT is difficult to understand why amateur interference with the listener-in should be on the increase, in these days of short waves, loose-coupled transmitters, and more selective B.C.L. receivers. Perhaps the sum total of interference hasn't increased and it is merely that the B.C.L. class is more vociferous about it than in the past. The fact remains, however, that huge volumes of complaints against amateur interference are accumulating in the offices of the various Supervisors, and have resulted in the letter to us from the Bureau of Navigation which is published on another page of this journal. In this letter the Bureau says that we have represented to them that short-wave transmitters can be built which do not interfere, and that if we can so construct our sets and fail to do so we will not be permitted to operate them between 8:00 and 10:30 P.M.; further, that it may become necessary to restore the quiet hours on all waves, including the short waves. We can add to that that there has been some discussion of increasing the quiet hours if they are restored, and making them 7 to 11 P.M., or even 6 P.M. to midnight. This dangerous situation is staring the United States amateur squarely in the face, and we must do something about it immediately.

The A.R.R.L. thru the pages of this magazine has given its members the best available technical advice on non-interfering transmitters, but that advice has not been followed as it should. The new regulations governing amateur stations have been interpreted in these pages, but circuits remain too tightly coupled and plate supplies remain atrocious. We have preached the necessity of co-operating with the listener-in, but the B.C.L. still has it thrown up to him that we have the "right" to interfere and that he ought to go "get a tuner" or take a jump in the lake.

A.R.R.L. Headquarters appreciate fully that the amount of interference created by amateur transmission is a negligible obstacle to satisfactory B.C.L. reception in comparison with other difficulties, such as foreign ships, overlapping of broadcasting stations themselves, fading, static, power leaks, etc., but most of these other obstacles are not readily curable and amateur interference is—by closing the amateur stations! The Bureau of Navigation knows that it should be possible to build a modern short-wave amateur station that will not interfere with a modern broadcast receiver intelligently operated, but they are confronted by a condition, not a theory, and they are requiring amateur stations that interfere to observe the quiet period.

A line has to be drawn somewhere, of course, and we do not for a moment believe that an amateur should be closed down because some "fan" next door can't copy the opposite coast on a 59c crystal set while the amateur is transmitting. Nor do we believe any criticism can be directed at an amateur transmitter when the majority of the receiving sets in its vicinity are able to receive programs satisfactorily. On the other hand, no amateur has a moral right to operate a transmitter during the popular evening hours if such operation disrupts reception on the majority of the receiving sets in its vicinity. The regulations of course expressly state that such interfering transmitters will be required to observe a silent period from 8 to 10:30 P.M., but the difficulty is that the regulation was drafted with the idea that it would be only the occasional station that interfered and interference has been so wholesale that the Bureau is considering clapping the lid back on all stations.

We do not want that to happen. To forestall it we must act immediately. The League calls upon all its transmitting members to take the initiative in reducing QRM caused the B.C.L., in stopping violations of radio law, in spreading an atmosphere of co-operation with the listener-in, and in engendering in the minds of the transmitting fraternity a realization of responsibility about the BCL-QRM situation. How about *your own station?* Have you followed *QST's* dope on the minimization of key clicks, on the necessity for having a good plate supply? Is your transmitter really loosely coupled? Does it interfere with listeners? If you don't know, find out. If it generally interferes, stop operating it between 8 and 10:30 P.M. until you can cure the trouble. Look thru back *QST's*

and apply the practical advice there given to your transmitter. Go see the listeners you interfere with; don't act as if you owned the earth just because you know more about radio than they do; help them out of their trouble. Rig up a wave-trap for them and show them how to use it; point out the too-long antenna; recommend the right kind of equipment for them; make over their single-circuit tuners into loose-coupled receivers, if they are willing, by adding a little primary coil or aerial coupling condenser and throwing the variable across the secondary to tune it. Listen to their interference and tell them what it is—most of the time it won't be an amateur. When you have your own situation clear, go help the other amateurs. Don't let any recalcitrant fellow in your neighborhood operate an interference-factory all night long. Make him see the light and play the game with you, for one such station can undo all your good work and a sufficient number of such stations over the country will bring back quiet hours for all of us. Get together at your clubs and talk this thing over. You can go on the basis that if we don't make a speedy improvement in the general situation by individual action all over the country, there will be a restoration of quiet hours; that the one way out is for every transmitting operator to come into a realization of personal responsibility and take the initiative in clearing up the difficulties in his own home town.

The A.R.R.L. has tackled big jobs like this before and put them over. If we all pull together on this one, there will be no general return of quiet hours.

—*Kenneth Bryant Warner.*

Official Wavelength Stations

THE A.R.R.L. Official Wavelength Stations that have been appointed by Messrs. D. C. Wallace and C. M. Jansky Jr. are as follows.

1	NKF	16	8AA
2	1XAM	17	8CCI
3	6BQB	18	3APV
4	7BK	19	4XE
5	5MN	20	5ZA
6	9AAL	21	9DXN
7	z2AC	22	9EGU
8	2WC	23	6ZH
9	9ZT-9XAX	24	5AKN-5XBH
10	1MK	25	2MU
11	8GU-8XC	26	4BY
12	9XI	27	9ZA
13	1CK	28	7GE-7ZX
14	1AWW	29	1IV
15	3BE-3ZW	30	9EIB

The number is now so large that everyone can use these O.W.L. stations to spot calibration points on wavemeters and tuners. As we have explained before—there will be no schedules, the stations will simply carry on their regular work on the 5, 20, 40, 80 and 150 meter bands, announcing the wave they are using at the close of each sending. For instance, 9ZT will finish up

"u 9ZT 76" or "u 9ZT 180" or "u 9ZT 42"

This is *not* the same thing as the Bureau of Standards system, since there are no regular schedules and there is no attempt to secure the extreme accuracy that is provided by WWV, 9XI and 6XBM. The O. W. L. S. can be depended on to 1% however in most cases and 9ZT-9XAX checks them up regularly to see that their waves are correct.

All correspondonce regarding O.W.L.S. should go to D. C. Wallace, 54 Penn. Ave., Minneapolis, Minn.

QST Articles

SOME of the members of the League do not seem to understand how *QST* gets its articles. We are a family newspaper, the League being our family. Whatever *QST* earns is used to run the family—and it is an expensive family to run, for one has to pay for traveling expenses, traffic Department field work, etc. Therefore *QST* may earn money and still not have any to spend for articles—and we have never paid for them. All the material appearing in *QST* is gotten from our membership, and they charge us nothing for it.

Of course it is hard to look a gift-horse in the mouth, but we must do it, a good *QST* cannot be made unless all hands send in *much more* material than we can use, then we will be able to pick the best—but of course the rest must go back.

But what if the article didn't get into *QST?* Did it not help just the same? It most certainly did, for often an article that does not get printed will still furnish good ideas that can be used in the experimenters section, in the information service or in the general work of the League.

Getting back material is part of the writer's game—and one has to put up with it to play that game.

The Reflection of Short Waves

By John L. Reinartz, 1XAM

Again it is Q S T's privilege to present an article of the first importance in radio affairs; this time from that tireless experimenter, John L. Reinartz. We consider this article one of the most important contributions made to radio literature.

REFLECTION plays an important part in the use of the shorter radio waves. This became apparent during a series of experiments which I undertook early in 1924 and which lasted throughout that year. The details of these experiments will not be given here since they are fully recorded in a series of articles which begin in the April issue of Radio News. In the very first of these tests, when very short waves were used, the signals became *weaker after sunset* instead of becoming stronger as is expected of wavelengths above 100 meters. Also, as more and more observers entered the test, it was discovered that the signals were *stronger at a great distance* than they were nearby. Thus it became clear that the short wavelengths acted quite differently from those of 100 meters and above. In fact, it is not an exaggeration to say that an entirely new field of possibilities was opened.

The reflection of radio waves is nothing new. Many authors have presented the idea of the Heaviside layer in a variety of different ways so as to account for such things as fading, extreme ranges at night, and so on. The Heaviside layer, it will be remembered, is a theory devised by the late Oliver Heaviside. This theory assumes that as one goes up through the earth's atmosphere one finally gets to a point at which the gas pressure is so small that the atmosphere becomes a good electrical conductor. Since a good conductor is also a good reflector of radio waves, we have thereby surrounded the earth with a reflecting shell. Nearer the earth is more air which is a conductor during the daytime but an insulator at night. The reason for this change is that the sun's rays ionize the air in the daytime. This amounts to an extension downward of the reflecting shell, therefore the reflector is always nearer the earth's surface on the sunny side of the earth than it is at the dark side of the earth. Some time after the sun sets, deionization occurs in all the lower atmosphere and there is left the upper layer we have described before. See Fig. 1. The Heaviside theory assumes that radio waves glide along the inside of this shell for great distances with very little loss. The irregularities of reception are accounted for by irregularities in the Heaviside layer. Changes in signal strength at a given point are accounted for by saying that the Heaviside layer is agitated and therefor reflects in a fashion that changes from minute to minute.

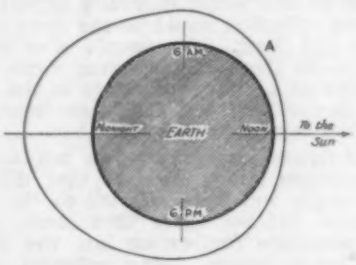


FIG. 1

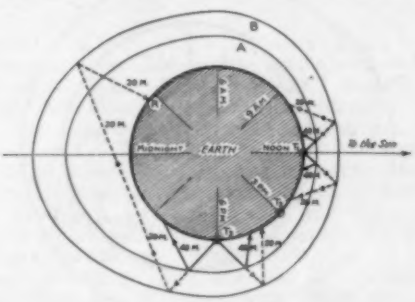


FIG. 2

During the very extensive tests made throughout 1924, many effects were met which suggest a modified theory. A few of these effects are:

1. In tests at noon there was a minimum wavelength that could be heard by the receiving operator. A shorter wavelength would not answer, no matter how much power was used. At 50 meters the difference between a wave which would give very strong signals and a wave which would give no signals at all was less than one meter. At the same time one could not go up on the wavelengths very high until the signals again failed to come through. There was then a very narrow band of wavelength which would work at this time of the day. Later in the after-

noon this band would move upward somewhat.

2. It was found that in daylight transmission the signals could be heard through only a very small territory right around the station, after which there was a broad belt in which no signals at all could be heard. After this the signals could be heard again for a very great distance. See Fig. 4. The small territory around the station is not of much use; in fact it may be less than a quarter of a mile across. Therefore we are interested in the distance at which signals can *again* be heard. During the forenoon this distance is less toward the East than toward the West. At noon it is the same in both directions and during the afternoon it is less toward the West than toward the East.

3. The general effect of the shifting of the useful waveband was that during the forenoon, contact between two stations could be maintained by gradually shortening the wavelength in steps of a few meters at a time until noon. As the afternoon progressed the wave would again gradually have to be made longer in similar steps. The rate at which the waveband shifted was greatest around sunrise, least at noon and again rapid around sunset.

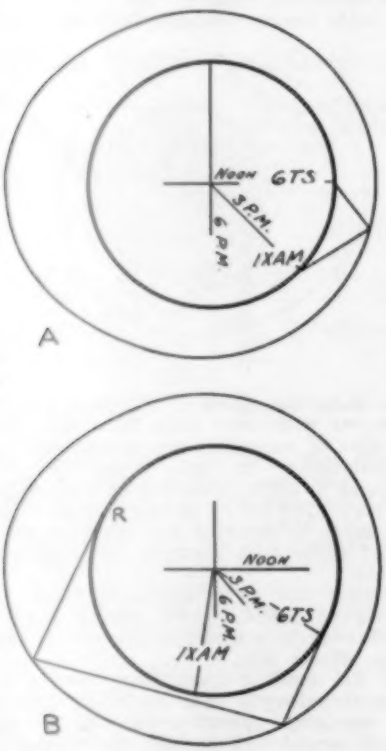


FIG. 3

4. As the waveband shifted it was found that when a certain receiving station had just lost the signals other receiving stations further off could still hear them.

5. In afternoon operation, if communication was first established on the shortest wavelengths that would work, signals would gain slowly in strength and then drop off very quickly to zero. In forenoon operation signals would be stronger when communication was first established and then would fall off slowly. This would be expected from the different rate at which the waveband was shifting.

6. The size of the "dead belt" was independent of the power of the transmitter but outside of that belt the range of the transmitter depended upon the power used.

During 1924 some 5000 reports on the transmission of 1XAM were received from 5 observers in Europe and 18 in North America.[1] Inspection of these reports suggested that different frequencies are reflected from different heights above the earth's surface. They also suggested that this height (for a given wavelength) varies with the time of the day and with the seasons. It then occurred to me that the sun might be the determining factor and might account for the effects mentioned. We have said that the sun causes ionization of our atmosphere and that this effect is greatest at noon and least at midnight. Therefore the inside of the reflecting shell we have been talking about will be nearer to the earth on the sunny side than on the dark side. This was shown in Fig. 1. This figure fits in with some of the things that have been observed and mentioned. Looking at it one would naturally expect that at noon reflection would be the same to the West and East. One would also expect that in the forenoon the waves would come to earth at a greater distance to the West than to the East and finally one would expect the reverse in the afternoon.

The figure just drawn does not account for another thing, the fact that different wavelengths *are not reflected to the same distance.* If we agree that short waves will penetrate further up into the Heaviside layer before being reflected down again, then we will account for this also. This idea is shown in Figure 2. In this drawing A is the same layer that was shown in Figure 1. The solid arrows from

1—During the course of his various tests Mr. Reinartz has held two-way daylight conversation with 6TS, 6AGK, 6GM, 6ARX and 7GS. His signals at waves between 18 and 42 meters have been copied many times by French 8BF and also less often by British 5LF, 2LZ and 5GL.

the transmitters T1 and T3 show how a wavelength such as 40 meters will be reflected. It is seen that these waves all come down rather close to the transmitter and no particularly great ranges result. Now if 20 meter waves penetrate further upward before being reflected they must be reflected from a second layer B somewhat higher up. Naturally this will cause them to come down much further from the transmitting station as can be seen easily enough by following the dotted arrows. In this figure we have followed only those waves which started upward at an angle of 45 degrees. There are things which make one suspect that this is the most effective reflecting angle.

If Figure 2 is correct some of the other things spoken of can also be accounted for. The reason that there was always a shortest wavelength that could be heard by the observers in the 1XAM tests was because any wavelength still shorter would go too far up in the Heaviside layer and would be reflected down at a very great distance, passing entirely over the receiving station. These things can be cured by going to a longer wavelength which comes down sooner.

Figure 3 also attempts to represent the actual results of tests between station 6TS (station of Paul Willis at Santa Monica, California) and 1XAM (South Manchester, Conn.) The distance between the two stations is about three hours in time.

When 6TS is transmitting on 20 meters at noon Pacific Time (Fig. 3a) he can just barely be heard at 1XAM. By 3 P.M. Pacific Time, the signals are no longer audible at 1XAM. Figure 3b shows why—the waves are being reflected from such an al-

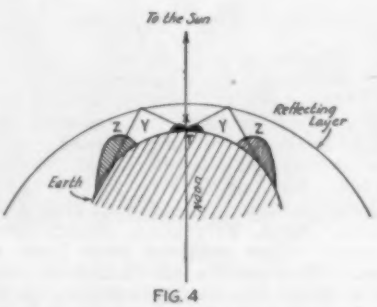


FIG. 4

titude that they miss the earth. Possibly if there were an observer on the earth at the point marked R 6TS's signals would be found to be coming in splendidly there. When 6TS is transmitting on 40 meters at noon Pacific Time, his signals are reflected to earth much too close to him to be heard on the east coast. During midwinter these signals commence to come in at 1XAM about 4:30 P.M. Pacific Time, and are good for about two hours, when they too are reflected from such a height as to miss 1XAM. Then the 75-meter band is used, with good results until dawn.

In Figure 4 is shown approximately the way in which the audibility of the received

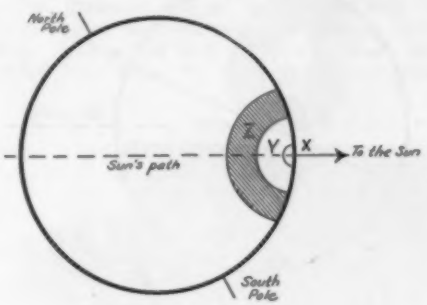


FIG. 5

signal changes with distance from the transmitter. This figure will stand a bit of explaining. X is the small region in which the station can be heard directly. Y is the dead belt in which nothing can be heard and Z is the belt in which the signal will be heard strongly. Of course these territories have only been shown edgewise in Figure 3 and are really shaped somewhat as shown in Figures 5 and 6 for different locations. When it is noon at the sending station and the sun is overhead the areas are circular with their centers at the sending station. Reflection occurs equally in all directions. See Fig. 5. For any other time of the day and for any location where the sun does not shine directly downward at noon the belts are not truly circular. See Fig. 6.

The work referred to has been based on experiments with waves between 20 and 60 meters. On wavelengths above 60 meters the effects were not noticeable and during daylight the effective range of the wavelengths above 60 meters did not compare favorably with their night range. One can go further and say that the daylight range of wavelengths above 60 meters was not found to be equal even to the range which they gave at night with unreflected (gliding wave) transmission.

I hope that this work will lead to the accumulation of actual figures that will be of practical assistance in choosing the best wavelength for any given operation condition. We should not be content to try to reach the receiving station by direct (unreflected) transmission because this takes too much power. With one kilowatt input the range by direct transmission is but 10% of that obtained with reflected waves of a length between 20 and 40 meters. If

we are willing to choose the wavelength for each particular distance and each particular time of day it is possible to put the region of strongest signal right on the receiving station and to obtain communica-

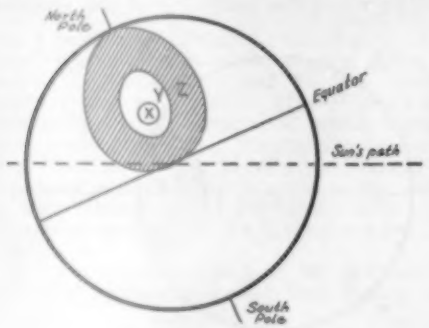


FIG. 6

tion with strong signals but small input power. The advantage of the short wave is not that it is radiated more effectively but that it is reflected to points further away with the result just the same as if it had been bundled up and delivered intact at the receiving station.

1925 will see direct international contact on waves below 1 meter and even now the American Radio Relay League is asking its government for a band at or around that wavelength. The problem is by no means solved; rather this is just a beginning. There is no place on earth that harbors an amateur who cannot be of service in this work. There is much work yet to do, so much that I ask all amateurs to co-ordinate their work with that of others who are working at the same problem. Who will help during 1925 to add to the information now at hand?

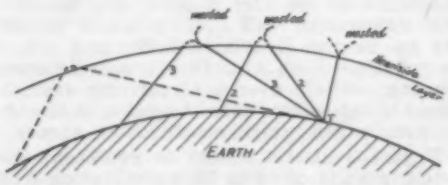
Acknowledgment

The information leading to this article was obtained through co-operation of the amateurs of the world and from my own observations of the behavior of signals from America, Europe and Australia. I am very grateful to those who have actively co-operated with me and to those who have contributed without knowing it.

Editor's Notes

[The thought that high-frequency wave motion will penetrate the Heaviside layer to a greater elevation than longer waves is rather in opposition to our generally accepted beliefs on such matters and may deserve further investigation.

The apparent best angle of reflection may be accounted for by considering the layer as a diffuse reflector. In the figure herewith the energy following path 1 straight upward from the transmitter can be supposed (after it strikes the Heaviside layer) to spread like a jet of water from a fountain. The energy would then wander off in the diffuse reflector and become lost. Energy leaving by path 2 would be reflected fairly effectively to some moderately distant point. At some still flatter angle as the one followed by path 3 the reflection will be very effective indeed. These changes will be understood by remembering the way sunlight is reflected from the clouds. It looks as if the reflection should become better and better as the angle grows flatter. This may be true but there is suggested the possibility that energy started at such a low angle as that following path 4 is compelled to struggle through too



many obstructions and therefore never gets clear of the earth. It seems reasonable to assume that solid obstruction on the earth's surface such as houses, trees and particularly electric wiring systems might prove effective barriers to the short waves.—Tech. Ed.]

Movies!

THOSE who have to do with planning a convention or get-together in the near future will be interested in hearing of a letter we have just received from Mr. J. L. Bernard, Publicity Manager of the Radio Corporation. He says that they have prepared a two-reel film on the Radio Corporation Trans-Atlantic work, with scenes at Rocky Point, Riverhead, Broad Street, and many other stations over here and abroad. This sounds as though it might make a most interesting addition to any program. And the best part of all is that the Radio Corporation is distributing the film free. For details, write them, attention of Mr. Bernard, at 233 Broadway, New York City.

R. Saraiva, an A.R.R.L. member at Macao, China, reports that 6CMU and 6AWT are only U.S. stations to be heard in China.

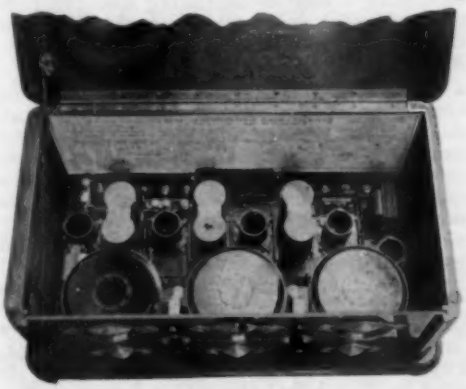
The Design of the Grebe Synchrophase

By R. R. Batcher*

IN the October issue of *QST* there appeared a short descriptive article on the new Grebe Receiver, the Synchrophase. Due to the interest which was aroused in the numerous features of this receiver, a short technical article will doubtless be of value to readers.

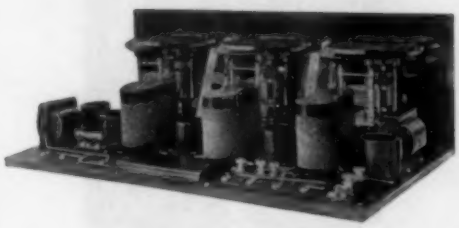
About a year ago the Research Laboratory Staff was enlarged and investigation of an intense nature began. Data compiled in previous years proved invaluable in determining just what lines should be concentrated upon. It is the intention of the author to discuss many interesting and instructive results that have been discovered during the investigation, which was along two lines: First—the circuit, and then the equipment that was to be used in the circuit.

It was early decided that the whole question of tuned radio frequency amplifier circuits should be re-opened and a special consideration given to the multiple tuned stages having minimized magnetic and capacitative coupling. The main problem was to get the maximum amplification per stage. Besides this, the tubes should not oscillate. Toward this end many methods to prevent inductive coupling were investigated, including the use of torodial coils, the mounting of coils, and other schemes, and in the end all were discarded. It was found that much superior results could be obtained with the use of the "binocular" coils, which were a distinctive feature of the new receiver.



The "Binocular" Coil

These tuning coils consisted of two inductance units connected in series. The coils are 1⅝" diameter and contain 85 turns of 20/38 Litzendraht. The turns are in the same direction on each of the two coils, and the lower end of the front coil is connected to the filament end of the circuit and the lower end of the rear coil is connected to the grid. The upper ends of both coils are connected together. In case the transformer



contains a primary, it is wound on a tube *inside* of the coil connected to the filament end. It will be seen that any inductive coupling from other parts of the circuit affect both coils alike but in opposite directions so that the total inductive coupling is zero. Another feature possessed by these coils is that they will not pick up energy directly,—no matter how near the receiving set is located to the transmitting equipment: therefore, *if the antenna and ground are disconnected, no signal whatsoever is heard.*[1] *This tends to increase the selectivity very greatly in congested districts where numerous stations are located.*

It was found that all capacity coupling and conductive coupling should be made as small as possible but the co-efficient of coupling (electro-magnetic) between the primary and secondary of these transformers was made as high as possible. The electro-static coupling between the primary and secondary was made very small.

During the determination of the transformer ratio it was discovered that the actual ratio did not affect the results directly, the idea being to make the secondary as large as possible, consistent with the wavelength range desired. Of course, the smaller the capacity of the tuning condenser, the smaller its wavelength ratio, as the minimum capacity of the condenser itself is *very small compared with the distributed capacity in the coils.* A large inductance increases the L/C ratio and increased selec-

* Research Engineer, A. H. Grebe & Company, Inc.

1. This is a feature in which most of our present receivers are sadly lacking—no matter what wavelength they are designed for. More discussion of this point will appear in *QST*.—Tech. Ed.

tivity results. Separation of stations 10 kilocycles apart is easily possible if they are not in the immediate vicinity.

The number of turns on the primary was found by experiment, the upper limit in general being where the circuits became unstable and oscillated.

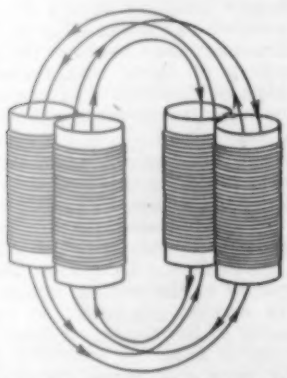
The use of small wire in winding the primary coils resulted in a very small elec-

BINOCULAR COILS

tro-static co-efficient of coupling, and the result was that a much larger primary winding could be used with a great increase in the amplification per stage but without increasing the tendency to oscillate.

The shunt capacity around the primary (either actual or distributed) should be low, otherwise the primary circuit has the tendency to follow the tuning of the secondary, and this strangely, plays havoc with the amplification and selectivity.

By keeping the primary circuits in a condition (by careful design of coils) where



FIELD OF THE BINOCULAR COILS

they do not "tune" with the secondary, the phase conditions in each circuit are such that any capacity fields from one part to another are not destructive. Thus, any tendencies to oscillate from this cause are greatly minimized.

The use of a large inductance in the tuning circuits required the use of a very small condenser. This condenser, as designed, required precision manufacturing methods since the spacing of the plates was only .014 inch, yet it can be assembled so uniformly that the dial settings match within a hairbreadth, extremely abnormal antenna capacity being the only cause of deviation in the first dial reading.

As mentioned before, the coils were wound with Litzendraht, but every strand of this cable must be *thoroughly soldered at each end and must be continuous throughout.* It was thought that a D.C. resistance test would show up a broken strand, but manufacturing variations in drawing down the No. 38 wire often make results doubtful, so a *high frequency resistance measurement test is used* to insure every coil as perfect.

The Variable Condensers

The variable condenser has a maximum capacity of 225 and a minimum of 6 micro-microfarads, and is the smallest condenser, as far as its physical dimensions are concerned, that the author has ever seen. The resulting static fields are very small and since the rotor and end plates are grounded, no body capacity effects whatsoever are noted. The shaft is vertical so that the condenser needs no balancing and the new types of dial and vernier (resulting from this style of mounting) are much more easily adjusted.

The rotor plates embody a departure in the design of condensers and follow a plan devised by the author shortly after the broadcasting station waves were separated into frequency bands. These condensers have been used in our tests for some time and it is found that tuning is very much simplified since stations which are separated by equal *frequency* distances are separated by equal number of dial divisions. This "Straight Line Frequency" formula, for the design of these plates, as the result of my investigations, is more or less complicated, but will be taken up in a future article. It may be stated that the plates following this law have a smaller area for the radius of swing, so that more plates are necessary. For this reason, only the first three-quarters of the capacity range on this condenser follows the straight line frequency law. The stations appearing where the dial is ordinarily crowded are thus evenly separated, but a few of the stations appearing on the upper end of the dial where the normal separation is great enough not to cause unnecessary trouble, the condenser follows the ordinary straight line capacity law.

There is little difference in circuits if the equipment in each circuit has equivalent

losses. Therefore the interesting thing about the synchrophase is not the circuit but the design of the parts used in it. The synchrophase circuit transformers have double primaries, one of which is capacitively connected to the grid. It is found that the tube capacity feed-back is only a small portion of the coupling usually found. It was necessary then to find the source of every type of coupling and to eliminate as many of them as possible. Since the resistance in the oscillating circuit is very low, due to the condenser design and the design of the Binocular coils, it was extremely difficult to prevent oscillations in many experimental sets, and the final style is the result of careful study. As mentioned before, electro-static capacity between the primary and secondary is very important. The direction of the windings of the primary coil should be the same as the secondary coil, and the connections should be the same in each stage. To provide for operation with defective "B" and "C" batteries in which high resistance internal connections are found, one-microfarad by-pass condensers are provided across these batteries. The location of several leads in this circuit with respect to the others was very important. For instance, the grid return lead in the R.F. stages, connecting to the negative end of the "C" battery, is extremely sensitive to feed-back currents and its location required special consideration.

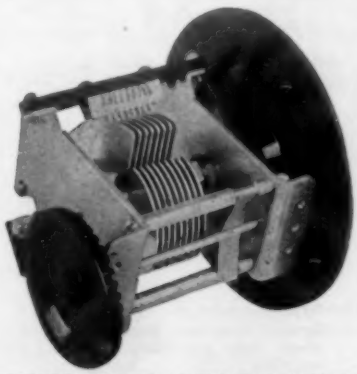
Each Synchrophase Receiver is tested for oscillations with 190 volts on the plates, *which is much more than should ever be employed by the user with the present type of tubes.*

There are many other details of interest which might be included here, but they will be held for another article. It is believed that many of these features may be applied to amateur receivers with remarkable results and preliminary tests have shown this to be true.

The Binocular coils, for instance, may be used for short wave receivers and as many stages of Radio Frequency Amplification can be used as desired, since the arrangement of the coils is not limited to three stages. The more stages used, the greater the experimental work necessary in eliminating feed-back due to conductive or capacity factors, but if one cares to experiment with the elimination of other types of coupling the results are worth-while.

In short wave receivers, the tube coils which comprise a Binocular Coil unit may be connected in parallel, instead of in series, taking care that the fields from the two halves are in opposite directions. This results in a smaller value of inductance with a much smaller radio frequency resistance. The author is working out a practical method of computing the correct number of turns for these coils for various wavelength ranges and the results will be available to the readers to be incorporated in an article later.

The Binocular coil was developed by Mr. P. D. Lowell, who devoted much effort toward the solution of the various problems



THE STRAIGHT-LINE VARIABLE CONDENSER WITH FRICTION VERNIER

encountered in connection with the design of the Synchrophase Receiver, and particularly with the design of the field-less coils. The Straight Line Frequency Condenser was devised by the author as a result of a survey of the requirements for the new tuned radio frequency receiver.

The Grebe Synchrophase Circuit

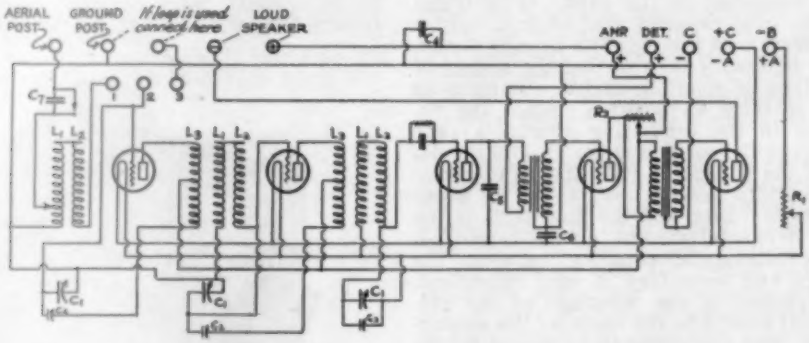
OUR readers have so insistently demanded the circuit of the Grebe Synchrophase receiver that Mr. John M. Clayton, of our Information Service, has traced the circuit in one of these receivers and we are reproducing his sketch herewith.

The absolute accuracy of the circuit is not guaranteed as it is difficult to trace in the finished receiver. We wish also to point out that the performance of a receiver is not primarily due to the circuit and that anyone wiring up a set in accordance with this drawing will not necessarily get synchrophase results.

For a more detailed discussion of the set itself, see the article by Mr. Batcher which appears in this issue. Please pay especial attention to his statement that results depend on design and not on the circuit alone. It is also worthwhile to remember that Litzendraht is difficult stuff to use successfully and that Grebe does this only because every individual coil is measured at radio frequency to make sure that it is all right. If one doesn't want

to do this it might be better to use solid wire in the first place. The inductance of the two secondary coils in series is about 350 millihenries, the range of the variable condenser is from 5 to 220 micromicrofarads (.00022 microfarads). The secondary inductances are wound with Litzendraht having 20 strands of No. 38 wire. The primary is a single No. 40 wire. The circuit shown here is of the type MU-1 which employs standard tubes. The MU-2 employs UV-199 or C-299 tubes and employs six of them. We are not quite sure but suspect that the additional one is used in parallel with the fifth one in the last audio stage.

The resistance connected to the plate of the first amplifying tube is actually a shunt across the amplifying transformer primary and acts as a volume control.



C6 & C1—Bypass condenser, ⅛ μfd.

C4—Bypass condenser, 5000 μμfd (.005 μfd) about right but other capacities should be tried.

C7—Fixt antenna series condenser of small capacity. 100 to 250 μμfd (.001 to .00025 μfd) will serve. Use a good mica condenser.

R1—6 ohm rheostat.

R2—Volume control, variable high resistance. Should be continuously adjustable (not by steps) so fading can be counteracted. Bradleyohm suggested.

L1—74 turns Litzendraht (First L1 tapped 15 turns frog lower end).

L2—74 turns Litzendraht.
Note—The receiver frog which the diagram was traced used 47 turns, which is not in agreement with the 85 turns mentioned in Mr. Batchers article.

L3—18 turns No. 14, tapped at 9th turn.

C1—220 μfd (.0002 μfd) variable condenser. Grebe set uses straight frequency line type. Next best is straight wave length type, of which several good makes are are available.

C2—Stabilizing condensers, 5 μμfd (.000005 μfd), ordinary "neutrodones" will answer.

C3—Vernier condenser used to make dials 2 and 3 run together. A 5 μμfd condenser with screwdriver adjustment is desirable.
Important Note—If aerial is used connect post 1 and 2 together. If loop is used transfer this connection to posts 3 and 2.

Rules Governing the A. R. R. L. Information Service

1. Before writing, search your files of *QST*. The answer is probably there.
2. Do not ask for comparisons between advertised products.
3. Be reasonable in the number and kind of questions you ask.
4. Put your questions in the following form:
   A. *A Standard Business Size* stamped, self-addressed envelope MUST be enclosed. No stamp required from foreign countries.
   B. Write with typewriter or legible ink on one side of sheet only.
   C. Make diagrams on separate sheets and fasten ALL sheets together.
   D. Number each paragraph and put only one question in a paragraph.
   E. Keep a copy of your letter and diagrams.
   F. Put your name and address (NOT merely call letters) on each sheet.
5. Address all questions to Information Service, American Radio Relay League, 1045 Main Street, Hartford, Conn.
6. Please remember Rome was not built in a day.

FLASH—6AWT WINS HOOVER CUP

Just as our forms close the 1924 Hoover Cup was awarded, by action of the League's Board of Directors, to Bartholomew Molinari of Station 6AWT, at San Francisco, Calif. Particulars will appear in our next issue.

Navy Picks Schnell for Tests

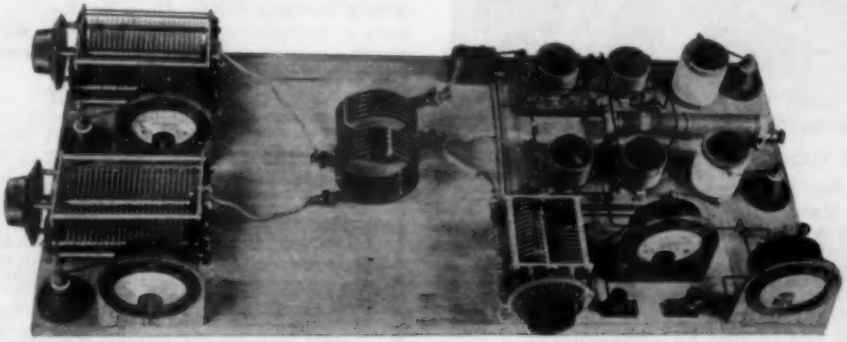
The Traffic Manager Accompanies The Fleet to Australasia on Summer Cruise with Short Wave Set Signing NRRL. Handy of 1XAH Becomes Acting T. M.

THE A. R. R. L. has granted seven months' leave to its Traffic Manager, Lieutenant F. H. Schnell, U.S.N.R.F., in order that he may accept active duty in the Navy for the purpose of conducting some short wave radio experiments during the coming manoeuvers of the U. S. Fleet in Pacific waters.

Schnell will sail from San Francisco in middle April, probably on the flagship, the U.S.S. *Seattle*. The Fleet will engage in manoeuvers in the vicinity of Hawaii until late April, visit Hawaii until sometime into May, and then steam to Australia and New Zealand for a friendly visit that will occupy most of July and August, various South Sea Islands being visited enroute and returning. It is expected to return to the west coast late in September. Throughout this voyage Schnell will have several short-wave transmitters and receivers at his disposal, for the sole purpose of engaging in as much experimental communication with the short-wave stations of the world as possible. The Navy is desirous of obtaining data on the capabilities of short waves. The installation will have this as its only purpose, and will be entirely dissociated from the business of the Fleet. Schnell will be on special status and will have nothing to do but pound brass to his heart's content; no official business that must be handled. Aside from NKF his work will be almost altogether with amateurs.

The main transmitter will be the 54-meter set that has been heard so much of late from NKF, where it was built. It is crystal-controlled, has an output of 1 k.w., D.C. supply, and will operate on 54.4 and 27.2 meters. The transmitter from 1XW will also be aboard, for use on the 20, 40 and 80-meter bands, and there will be parts with which still another similar set can be built. These sets use four 50-watt tubes, two on each half of the A.C. supply cycle, or they may be used on D.C. Two receivers will be used, both low-loss autodynes with only audio amplification, one built at Bellevue and one by Schnell.

The Navy has assigned the call NRRL for this work. When you hear it, it means that Schnell is on the other end. He will be ready to test with anybody anytime, and amateurs of all countries are invited to communicate with NRRL. The Navy wants reports on NRRL and it is requested that a



ONE OF THE SHORT-WAVE TRANSMITTERS SCHNELL WILL USE ON NRRL

This set was built by F. H. Schnell with portability and accessibility in mind. Comparison with panel sets is invited.

Although shown with the usual inductively-coupled Hartley circuit the set can also be operated with the peculiar circuit used in the set at 1XAM. See page 33 of QST for Feb. 1925. When operating in either way no primary capacity except the tube capacities is used.

Wavelength ranges are as follows, for either circuit. Two coils, each with 6 turns ¼" copper strip edgewise-wound to a diameter of 3¼", 16-28 meters. The same kind of coils with 12 turns, 30-50 meters. Using two coils of edgewise strip wound to "8 diameter, 12 turns per coil, the range is from 55-120 meters.

Antenna and counterpoise series condensers—Special National with Velvet Vernier dials; maximum 250 micro-microfarads.

Variable grid condenser—National receiving condenser, capacity 250 micro-microfarads.

Plate condenser (stopping)—Mica and copper. Capacity about 1800 micro-microfarads.

Sockets—Navy special type with lava base.

Gridleak—1500 to 5000 ohms.

Wired with No. 10 enameled wire.

Tubes—1, 2 or 4 UV-203 Atubes used, either in parallel or else on both sides of the cycle.

Antenna meters—0-5 Jewell. Plate and filament meters also Jewell.

Base of set 32" x 14" x ¾". Note large space left for different types of helices.

report be sent to the Director, U. S. Naval Research Laboratory, Bellevue, D. C., with copy to A.R.R.L. Headquarters at Hartford, every time NRRL is heard or worked, giving the date, time, wave-length, audibility, reliability, etc.

F. E. HANDY, ACTING TRAFFIC MANAGER

Traffic Manager Schnell will be given shore leave in every port and permitted to act as a representative of the A.R.R.L. in establishing contact with foreign amateurs. This is a particularly splendid opportunity in the case of our friends in Australasia and New Zealand. Amateurs at every port of call are invited to look him up.

This cruise presents the long-awaited opportunity for us to test at big DX with somebody on the other end who knows our stuff. There will be all manner of conditions and seasons and distances and times of day. We suppose Reinartz of 1XAM will be trying to work him at New Zealand on 10 meters at noon. And what a chance for 'round-the-world relaying, for picking up hams in strange places, for tying up the amateurs of different countries! The A.R.R.L. of course is highly honored that its Traffic Manager should have been selected for this work. In a letter to Mr. Maxim thanking the League for releasing him, the Navy Department says in part:

"It is hoped that great benefit will be derived from these experiments and it is felt that with Lieut. Schnell in charge, full and authentic information will be had at the end of the cruise, of the capabilities of high frequency radio communication for our purposes. At the same time, it is expected that Lieut. Schnell will gain experience of great value to your splendid organization. Both the Navy and the American Radio Relay League are to be congratulated."

Handy Relieves Schnell

Mr. F. E. Handy has been elected to become the Acting Traffic Manager during Mr. Schnell's absence. Mr. Handy had one of the crack stations of the country last winter, 1BDI-1XAH at the University of Maine, Orono, Me., and his call is a well known one. He is a Maine man, his home being in Augusta. Since his graduation he has been attending Westinghouse engineering school, from which he was released to come to the A.R.R.L. Headquarters Staff. So the Traffic Department will carry on.

Babcock Goes Too

Lieut.-Commander A. H. Babcock, U.S. N.R.F., A.R.R.L., Pacific Division Director, 6ZD, accompanies the Fleet as far as Honolulu as a Communications Officer, and will participate in the radio work of the Fleet. He had originally contemplated attending the I.A.R.U. Congress but felt that there would be opportunity to do a great deal more for the League and its members in this way than by going to Paris. Well, who's hearing NRRL?

—*K. B. W.*

Oliver Heaviside

To radio, Heaviside was best known for his theory of the permanently ionized upper atmosphere which has been named the "Heaviside layer." That there were other, and even more notable works to his credit may be seen from the following brief obituary, taken from the "Electrical World" of February 14th, 1925.

The Passing of Oliver Heaviside

"With the death of Oliver Heaviside the world has lost one of the greatest mathematical physicists of all time. Known personally to fewer than a dozen people, he had lived a retired life for forty years. He received no conventional education, which largely accounts for his unconventional writings. These fill five large volumes. They treat of a variety of subjects, and their fame is due largely to his papers on the theory of the telephone and the discovery of the distortionless circuit. It was an extraordinary discovery, somewhat like Kelvin's KR law for submarine cables. It was made forty years ago, when there were but few who understood electrical theory. He restated the theory in 1893 in a marvelously simple and clear manner.

"He laid the cornerstone for long-distance telephony. Able mathematicians and physicists used his papers, and naturally, however willing to give him credit they may have been, the originator, a recluse who shunned every form of publicity, was eclipsed and obscured. This is the unalterable law of the world, and thus it happened that Heaviside's name is known to but few and his passing away is left almost unnoticed. None the less, one of the greatest creative minds has ceased to be."

A Reliable 3 to 5 Meter Sending Set

By W. H. Hoffman*

THE vacuum tube sending set described in this paper is the result of experimental work carried on with transmitters beginning as high as 600 meters. From this point the design was gradually carried down, step by step, until 3 meters was reached. At this point the operation is just as reliable as at the longer waves.

A number of obstacles were encountered as the wavelength was reduced, and in each instance some detail of design was found faulty for the new frequency. When analyzed each difficulty was found to have an explanation and remedy that could be applied.[1]

Some of the ways in which the set differs from the 5-meter sets described in recent articles are as follows:

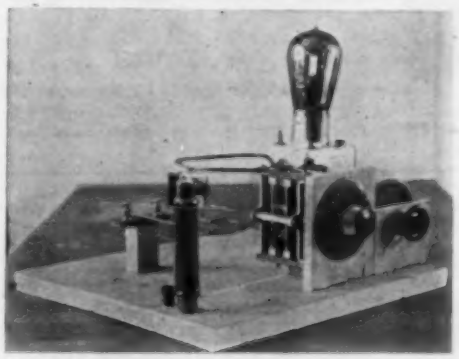
A—The radio-frequency part of the circuit is a Colpitts circuit. Usually such a circuit is supplied with plate power thru a radio-frequency choke coil; in other words, the shunt-feed idea is used. In this sending set the plate power is supplied by a series-feed system which uses bridge balance. This circuit has several advantages:

1—No radio-frequency chokes are used or necessary.

2—Continuous wavelength adjustment can be made over a band of little more than 2 meters.

3—Tuning can be done while the set is operating.

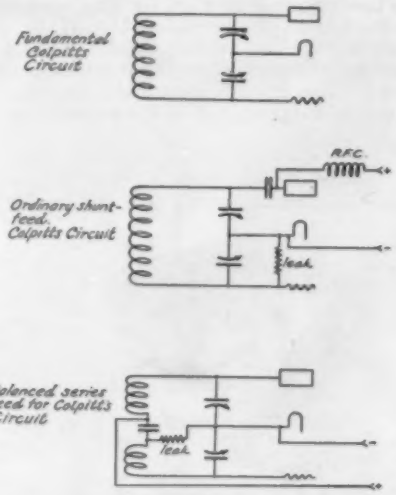
B—Capacity (for tuning) is added in addition to the natural tube capacity. Since there is no special effort to cut down these capacities, the tube is used in a regular socket.



THE SENDING SET

The Circuit

The tuning capacities (across the grid-filament and plate-filament are equal. They are the two halves of a double variable condenser and therefore move together. Electrically they are arranged in series and the inductance of the circuit is connected to their outside terminals.



The inductance of the circuit is a single 4" turn, divided into two equal parts. These two parts are connected by a stopping condenser C5 having a capacity of .003 microfarads. This capacity is large enough to allow the radio frequency to pass easily but stops the direct (or 60-cycle) plate supply. This condenser should be capable of withstanding the full plate voltage supplied to the sending set.

The two condensers and the two halves of the inductance are arranged in a series circuit. Since the two capacities are equal and the two inductances are equal, they form a balanced Wheatstone Bridge. At any instant the midpoint of the helix and the midpoint of the double condenser will be at the same *radio frequency* (not D.C.) voltage. The positive plate supply and the

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*9EK, Burgess Battery Co., Madison, Wis.

1—That is the difference between the engineer and the the tinkerer. The engineer sits down and thinks out the reasons for the trouble, then he is able to cure them. He does not "monkey".

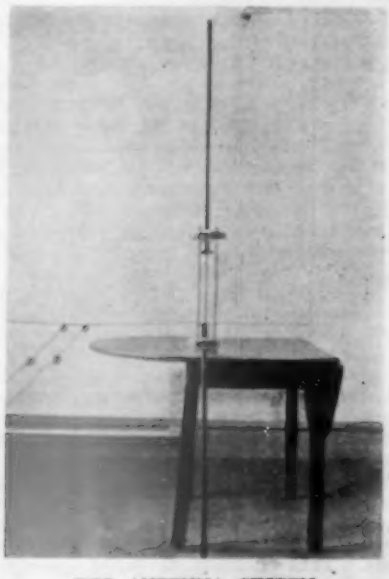
2—However they are good "insurance" and will make the owner feel better.

upper end of the gridleak are connected to the midpoint of the inductance, while the negative plate supply and the lower end of the gridleak are connected to the filament and the midpoint of the double condenser.[3] Since these two points are at the same R.F. voltage, there is no radio frequency loss thru the gridleak and plat supply.

Mechanical Arrangement

The tuning condenser is made by removing the stator of a Cardwell .0005 microfarad receiving condenser and removing all but two of the stator plates, also cutting out the center part of the supporting slugs. The two short slugs with the remaining two plates are then replaced. The two outside ends of the inductance are then fastened directly to these two stationary plates.

The tube socket is supported just above the tuning condenser on its own connecting leads, which are made of No. 12 B. & S. gage wire. The tuning condenser and the filament rheostat are supported on a small panel. The grid leak stands upright and forms a support for the midpoint of the inductance loop. Two binding posts on an insulating strip hold the secondary coupling coil and allow it to be moved to and from the primary.

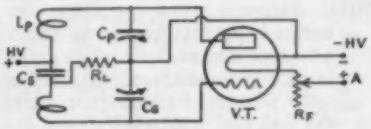


THE ANTENNA SYSTEM

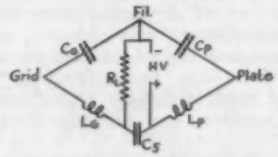
The set puts ½ ampere into this antenna which consists of two copper tubes, each 2' 9" long. They are held in a frame made of wood heads and glass towel bars.

3—Notice that the top end of the gridleak and the positive plate supply lead are both connected to the midpoint of the helix but on opposite sides of the stopping condenser. Thus they are at the same r. f. voltage but at opposite d. c. voltages.

No keying arrangement has been shown, but this may be accomplished by arranging the key to short out a resistance in the negative high voltage supply or to short a single turn loop placed in inductive relation to the primary inductance.[4]



5 METER TRANSMITTER



EQUIVALENT BRIDGE ARRANGEMENT

Cp & Co	a.0005 Cardwell Variable receiving Condenser, all stationary plates but two removed.
Cs	Two a.006 Micadons in series
Lp & Lo	Two halves of a 4 inch No.8 wire copper ring
RL	R.C.A. UP 1719 grid leak resistor.
RF	Remler No. 813 7 3 amp. 15 ohm rheostat.
V.T.	U.V. 202 - 5 watt Tube

Although this circuit arrangement is applied to a set working at extremely high frequencies, it has been tried at lower frequencies and is equally effective.

(Note—This article seems to us so excellent that it warrants delaying our other 5-meter material until next month.—Tech. Ed.)

4—This set ran on battery plate supply.

A new country was worked when 1HN of Hartford, Conn., connected with SJ of Costa Rica. SJ's wave is 90 meters and his note D. C. He has been heard by several other U's. SJ represents the first Central American country on the air.

Mexican stations BX and 1EI are not permitted to handle relay messages.

We have been informed that the following calls are being used by Signal Corps stations; CX1, C9F, C9G, C9H. Some had thought that these might be foreigners. As the Signal Corps generally uses the intermediate "V", careful listening will avoid any confusion.

Early to bed and early to rise.
And you'll never tell radio-distance lies.
—*Judge.*

The Regenaformer

By Glenn H. Browning *

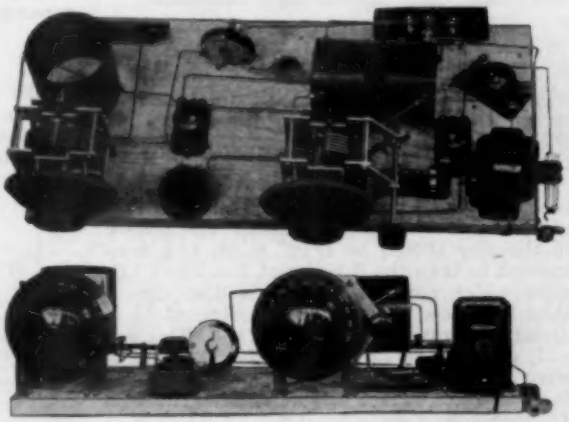
SEVERAL newspapers and magazines have featured the "Regenaformer" (sometimes known as the Browning-Drake set) for the reception of the broadcast band of wavelengths.[1] It has been suggested that the constants be given for a short-wave set covering the range from 15-200 meters.[2]

Before this is done the circuit itself will be reviewed briefly. The "regenaformer" set is built around an efficient tuned radio-frequency transformer. The set has the advantages that it will not radiate and that it is more selective than the usual set with an oscillating detector and audio amplifier.

Development of the R. F. Transformer

In August of 1923, Mr. F. H. Drake showed the writer some mathematics on a vacuum tube used as an amplifier in conjunction with a tuned radio frequency transformer, stating that there was a lack of efficiency in most R.F. transformers, and suggesting a thorough mathematical analysis of the circuit which, together with laboratory measurements, might throw some light on the right constants which were necessary for maximum amplification. Accordingly he and the writer worked together at Cruft Laboratory, Harvard University, for almost a year with the result that considerable information was collected.

The theory of the circuit predicted certain constants which would give the maximum radio frequency amplification, but when an R.F. transformer constructed in the ordinary manner, i. e. the primary and the secondary consisting of a single layer of coils, one fitting inside the other, was tested, the amplification was found to be extremely low. After some tests, it was found that the capacity between the primary and secondary of the transformer shown in Fig. 1, was the cause of the loss, as this introduced an e.m.f. in the secondary of the R.F. transformer which was not in phase with the e.m.f. induced by magnetic coupling. A "slot" winding was then adopted with the result that about 90% of the radio frequency amplification predicted was actually obtained. In Fig. 2 curve A shows the theoretical amplification, curve B shows the measured amplification of the system shown in Fig. 1 with slot wound primary, while curve C shows amplification with a transformer wound on two concentric cylinders. In all three curves the same secondary is used while the primary is wound to the same inductance, also the coupling is the same. These curves shown are for the broadcast band of wavelengths, but give a good idea of the efficiency of the two methods of winding.



THE BREADBOARD LAYOUT OF THE REGENAFORMER

The analysis of the system and the complete set of curves showing the resistance of the secondary of the Regenaformer, together with the antenna coil, is too long to be included in this article which will deal

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* National Co., Cambridge, Mass.

1—The reader will see at once that the "Regenaformer" is simply the well-known neutrodyne, with the difference that the detector is equipped with a tickler. The advantage of the set over the usual neutrodynes is a triple one.

A—The "neutroformer" (here called a "regenaformer") is very well designed and therefore gives unusual amplification.

B—The regenerative detector adds greatly to the sensitivity of the set, also permits the reception of c.w. signals.

C—There are only TWO tuning controls, the third control being a tickler which does not need to be moved every time the tuning is changed.

Without any measurements at all and basing purely on "ear and judgment", one gains the impression that the set accomplished everything that the usual neutrodynes do with one more stage of R.F. amplification—i.e. with another tuning condenser and another tube.

2—Such a set was described by Don. C. Wallace on page 19 of January *QST*.

particularly with the construction of a receiver to cover the 60 to 200 meter band. This data, however, will be given in an early issue of this magazine.

Construction of the Set for 60-200 Meters

Fig. 3 shows a schematic diagram of the circuit.[3]

The coils, L_2 and L_3, are wound as shown, in Fig. 4. L_2 is a single layer selenoid wound

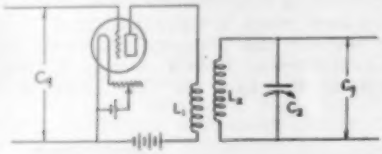


FIG. 1

on a three inch form of good insulating material, and consists of 20 turns of No. 20 D.S.C. wire. A tap is taken off 7 turns from the filament side of the coil for balancing.

A wooden disc with a groove cut in it is then turned out so as to fit snugly inside of tubing on which L_3 is wound. The groove in the disc should be 1/16" wide, and deep enough to take the 6 turns of No. 28 D.S.C. wire which compose L_3. This disc should then be placed so that the winding of L_3 is under the first turn of L_2. L^p, the "Tickler" coil, consists of 12 turns of No. 28 D.S.C. wire on a 2½ form as shown in Fig. 4. It is so mounted that it may be rotated through 180 degrees.

The coils L_3, and L_1 are wound in much the same fashion, L_1 consisting of 20 turns of

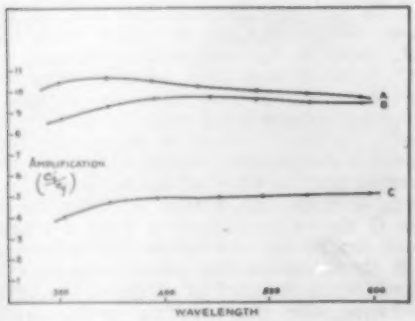


FIG 2

No. 20 D.S.C. wire on a 3" tube, while the primary L_3, is wound on a disc which fits inside the secondary, L_2. L_3 consists of 6 turns of No. 20 D.S.C. wire.[4]

When placing the coils in the set, it is necessary to mount them at right angles to each other, and in such a position that the imaginary line drawn through the axis of the R.F. transformer passes through the center of the winding of the antenna coil. The coils should also be at least seven inches apart. These precautions are taken in order to eliminate magnetic feed-back between the two which would throw the whole system into continuous oscillation.

C_1 and C_2 are two .00025 μfd. low-loss condensers with vernier dials.

R^p and C^s are the ordinary grid leak of about 4 or 5 megohms, and grid condenser .00025 μfd. C^b is a by-pass condenser of .001 μfd. across the audio transformer. BC is a small balancing condenser of about .00003 μfd. UV-199 tubes were used throughout because of their small internal capacity.

Balancing the Receiver

The easiest way to balance the set is to tune in some loud I.C.W. station.[4] Then turn out the first tube leaving it in its socket. You should be able to hear them with the first tube turned out. Then set the balanc-

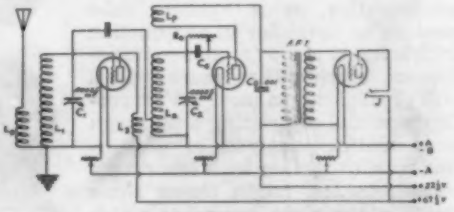


FIG 3

ing condenser so that changing C_1 does not affect the signal strength. This means generally that the balancing condenser will be set for minimum signal when the first tube is not lighted.

No attempt will be made to give the range or any of the stations received on the set, but it is sincerely believed that those constructing it will be more than pleased with the results obtained.

List of Apparatus Used in the Circuit

A list of apparatus used in the set constructed by the writer is given below, though other parts may be used which are equally as good, electrically:

Coils on hard rubber tubing—bakelite is practically as good.

Two National .00025 μfd. condensers with Velvet Vernier Dials.

Three General Radio 30 Ohm Rheostats.

The New General Radio 6-1 audio transformer.

3—See note 1 again, also compare with the diagram in the Wallace article.

4—In other words, almost any amateur station except 9EK. By the way—notice that the term "balance" is used.

Electrad variable grid leak.
Three General Radio UV-199 tube sockets.
The Rathbun Three plate vernier condenser for balancing.

Construction of the 15-76 Meter Set

For the 15-75 meter set the antenna coil, L_a will have 2 turns and the secondary coil L_1 will have 5 turns, on a 3" form as before. The secondary L_1 is tuned by a 250-micro-

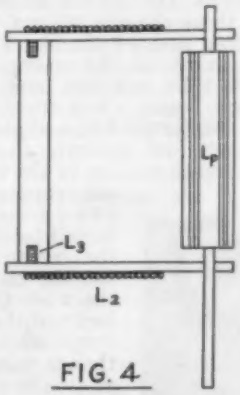


FIG. 4

microfarad[5] condenser with a low minimum.[6]

The R.F. transformer has two turns of No. 26 D.C.C. wire wound in a groove in the 3" tubing. This is the primary L_a. A layer of insulation is put over this and the secondary wound on. The secondary L_2 has 5 turns of No. 20 D.C.C. wire wound in a single layer. This secondary is tuned by another 250 micro-microfarad variable condenser like that used to tune L_1. The tap for balancing the R.F. transformer should be taken off from the second turn above the filament tap and a 3-plate Rathbun variable condenser can be used for balancing. This is, of course, the condenser "BC."

The list of materials is the same as before.

5—For some reason folks don't seem to understand what a micro-microfarad is. "Micro" means "millionth". Therefore a microfarad is one millionth of a farad. In other words, 1 microfarad = .000 001 farad. Now a "micro-microfarad" is a "millionth of a millionth of a farad". In other words, 1 micro-microfarad = .000 000 000 001 farad. And finally, 1 micro-microfarad = .000 001 microfarad.

Now then—why do we use a thing with a name so clumsy as "micro-microfarad"? Simply because it is a nuisance always to say that "This variable condenser has a capacity of point zero zero zero two five microfarads." Isn't it easier to say—"This condenser has a capacity of two hundred and fifty micro-mikes"?

That is why *QST* is going to use the "micro-mike". It isn't any harder—just remember that

1 microfarad equals 1,000,000 micro-mikes.

6—Quite a few condensers fit this description. The National Company makes a 250 micro-microfarad condenser especially designed for this.

For the Broadcast Wavelengths

For a range of 200-600 meters wavelength the following dimensions will serve.

The coils L_a and L_1 are combined, making a single coil of 52 turns of No. 20 double silk-covered wire on a tube 2¾" in diameter. This coil is tapped at the 27th turn and the antenna is connected at this point, either directly or through a 100 micro-microfarad (.0001 microfarad) fixed mica condenser. The circuit is then the same as that of Fig. 3 except that the antenna goes to the coil L_a.

The "regenaformer" is made as follows: A length of 2¾" tubing has a groove cut in it for the primary. The groove is about ⅛" wide and deep enuf to hold 26 turns of No. 26 or 28 D.C.C. wire which make up the coil L_a. A layer of thin paraffined paper is then wound on to make the surface smooth and the secondary coil L_2 is wound on. This coil starts right at the primary, continues over it and so on until 78 turns have been wound. This makes the coil complete except that a tap must be taken off at the 18th turn for the feedback condenser, just as shown in Fig. 3.

The tickler form is 2⅜" in diameter and has two grooves ⅛" wide in which is wound the tickler, using some such wire as No. 28 double silk covered. The number of turns must be adjusted to the goodness of the secondary circuit. The better your circuit, the fewer turns you need. A really good circuit will not need more than 15, a poor one may need as many as 30.

H. Leslie Jones of the C-B ranch in Texas sent in some questions to the Information Department, in a form which more ought to use. He lined his questions up with "yes" and "no" after them so that all we had to do was check one or the other and return the sheets. It took one minute exactly to answer his questions and there were several.

———

SMZS of Sweden is working every morning at 0600 G.M.T. on 84 meters.

———

Bill Schudt, Jr., 2CHY, has been made the Technical Editor of the New York "Telegram-Mail". Our congratulations, OM.

———

How Times Have Changed!
Ham: "I don't get much DX."
Another Ham: "Maybe your wave ain't short enough."

———

An Ohm saved is a loss earned.

The Eclipse Tests

WHAT happened to radio communication on Jan. 24th during the eclipse of the sun is told in striking fashion by a letter just received from Dr. Greenleaf W. Pickard. The letter follows:

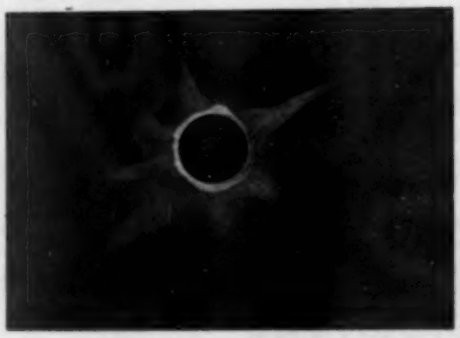
Newton Centre, Mass.
Feb. 21, 1925.

"S. Kruse, Technical Editor *QST*,
Hartford, Conn.

Dear Mr. Kruse:—

"I am sorry to say that no pictures of our apparatus or personnel were taken at Ithaca. Sometime before the eclipse I remember seeing a picture of Mr. Parkinson, of the Bureau of Standards, posed by a receiving set and recorder. I think Dr. Gold-Smith sat for a similar picture. But since the eclipse I have seen no such pictures, and have no idea where they can be obtained. Let us see if I can help you out some other way—how about a *portrait parle* of the eclipse effect?

"H. Nagaoka, in a paper entitled 'Effect of Solar Eclipse on Wireless Transmission' (Mathematico-Physical Soc., Tokio, Proc. 7, pp. 428-430, Dec. 1914) predicted that the effect of a solar eclipse would be to first weaken the signals, which would pass through a minimum, rise rapidly to a maximum, and then slowly decrease. This is exactly what we found to be the general eclipse effect, as shown by reception at Ithaca from WGY and WEAF, reception at Hamilton, Mass., of WGY, reception at Middletown from WGY and reception at Washington from 2XS at Rocky Point, L. I. The entire eclipse effect lasted nearly an hour, and consisted of a slow fall in both mean field and fluctuation amplitude to a minimum, which was reached about twelve minutes before the middle of the eclipse. This was followed by a rather rapid return to normal slightly before the middle of totality, which continued as a rapid rise above normal to a maximum, which was reached about five minutes after the middle, and followed by a slow descent to normal. This is well shown in the curve which I sent you recently.



INNER AND OUTER CORONA AT TOTALITY
(Composite of several sketches drawn near Hartford, Ct.)

"According to our most reasonable transmission hypothesis, the radiation from a transmitter is initially just like that from an ungrounded Hertzian oscillator, that is, it proceeds radially in straight lines. A large portion of the radiated energy struggles up through the lower atmosphere, and as the waves encounter ions they sway these charges to and fro, but as the mean free path of the ion is small in a dense gas, most of the energy thus imparted is lost by collision, and the waves suffer severe losses. But finally, at some high level, the waves find a slightly ionized layer at such low pressure that the ions can be swayed to and fro by the waves without excessive energy loss by collision, and in this layer, owing to the reaction of the moving charges upon the wave field, the velocity of the waves becomes slightly greater than in vacuo. Because of this increase of velocity aloft, the wave as a whole is bent to conform to the curvature of the earth, and travels around, even to the antipodes, on this curved path without substantial loss by absorption or scattering. From this high level wave-sheet, energy is continually shed down to earth, and in night time transmission over any considerable distance practically all the energy reaches the receiver by this route. This is in brief the Eccles-Larmor hypothesis.

"One consequence of this hypothesis is that the height of the wave-sheet is an inverse function of the transmission frequency. For transmission frequencies measured in megacycles the wave-sheet might be quite low, perhaps even under the isothermal layer, while for frequencies of a few hundred kilocycles or less, the wave-sheet might be in the neighborhood of a hundred kilometers above the earth.

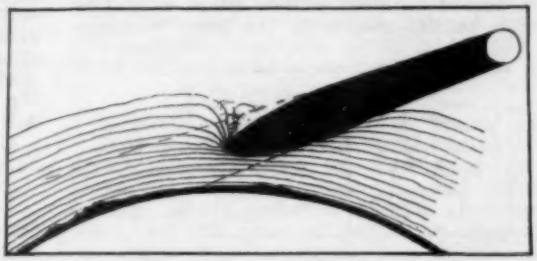
"If the ionization in the wave-sheet were perfectly uniform, transmission over great distances would be perfectly steady, that is, there would be no fading or swinging effects. Any change in ionization would

either dent or bulge the wave-sheet, and at the edges of such a dent or bulge wave energy would be shot off at a tangent, either up or down, depending upon the sign of the curvature. It is a matter of everyday experience that transmission over great distances is not perfectly steady; in fact, the changes from minute to minute are usually large, and we must assume from this that there are many and varying corrugations in the ionized upper layers.

"When the sun was eclipsed on January 24th an elliptical shadow was cast upon the ionized layer, and the production of ions within this shadow was decreased. Because of recombination, this very shortly resulted in a decreased number of ions at all levels, and as the height of the wave-sheet depends upon the frequency and the number of ions per unit volume, the level of the sheet decreased within the shadow; in other words, the shadow of the moon dented in the wave-sheet. And as the eclipse occurred, so far as this country is concerned, rather early in the morning, the shadow cone fell very slantingly through our atmosphere, thereby making the western edge of the dent a rather sharp one, and the easterly edge quite tapering.

"Aloft the picture is now complete. A big elliptical dent, several hundred miles in longer diameter, is plowing its way eastward at a gait of a mile a second through the wave-sheet. The bow of this dent is nicely tapered to avoid disturbance of the wave-sheet, but the stern is cut off rather sharply, and a choppy wake is left. Energy is scattered by this traveling dent, some upward and therefore lost, and some downward, so that a receiver on the earth's surface gets at one moment less, and at another more energy than normal.

"By the by, and off the eclipse for the moment, won't the newspapers have a lovely time with the Eccles-Larmor hypothesis, when, in some distant time, they have partially digested it! One consequence of this hypothesis, unlike the old Heaviside Layer one, is that there is no particular obstacle in our atmosphere to prevent waves arriving from outside reaching the earth's surface, nor, for that matter, shooting them

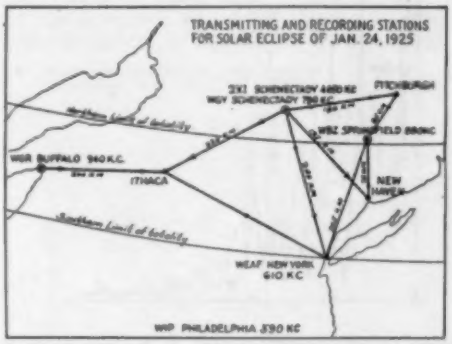


out to Mars or elsewhere, if the angle of the beam be great enough. Watch for the headlines. "Earth-Mars Talk, Long Forbidden by Heaviside, Now Permitted by Larmor".

Good Night.

Greenleaf W. Pickard.

"And now having read over my letter to you, a glance at the clock tells me that I have over half an hour before the last mail



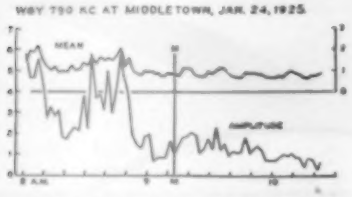
collection, and I am tempted to write a postscript.

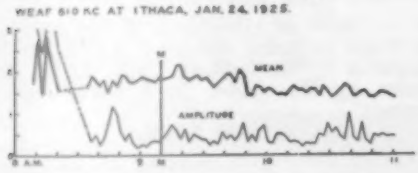
"Although the general eclipse effect for frequencies ranging from that of 2XS at 57, and WGR at 940 kilocycles was a decrease followed by an increase of field at the receiving point, there were exceptions. WGR as received at Ithaca was in a sense an exception, as the decrease before the middle of the eclipse was very slight, and the maximum thereafter was very great. Here both transmitter and receiver were nearly in the center of the path of totality, and separated by a distance only slightly longer than the major axis of the shadow spot. At some other points the decrease in intensity was accentuated, and the increase nearly or quite obliterated. When,

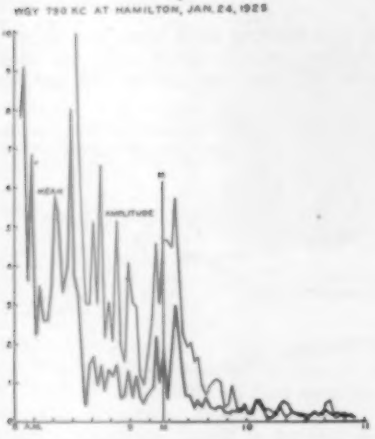
LOCATION OF RAINBOW BANDS ON CLOUD JUST AFTER TOTALITY
(Composite of several sketches drawn near Hartford, Conn.

months from now, we have fully analyzed these observations, I feel sure that these exceptions will fit in their proper place.

"The records and observations made at high frequencies are, with some exceptions, in accord with an eclipse effect consisting of a partial return to the poor transmis-







sion of the early morning hours, that is, the eclipse effect was a partial return to night conditions. This fits in well with the transmission hypothesis outlined above, in which the wave-sheet for these high frequencies is at a relatively low level. Our data at high frequencies is unfortunately less in amount and precision than that at the lower frequencies, both in the special case of the eclipse, and in general as well.

"At Ithaca some excellent directional observations were made on WGY and WEAF, which show directional shifts apparently strongly correlated with the eclipse. These observations were made by Prof. Merritt and others of the Department of Physics at Cornell, not only on the eclipse morning, but on mornings before and after, just as was done in my recording work.

G. W P."

The Eclipse Tests

During the eclipse three radio tests were made. They were as follows:

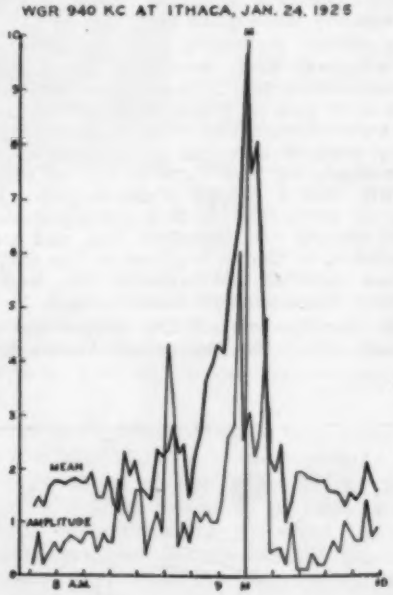
A—Experimenter's Section Test under direction of Dr. Greenleaf W. Pickard.

B—A.R.R.L.—*Scientific American* test under direction of a committee consisting of Dr. E. E. Free of the *Scientific American* staff, Dr. Brown of Yale University and Mr. C. A. Service, Assistant Secretary, A.R.R.L.

C—*Scientific American* test for broadcast listeners.

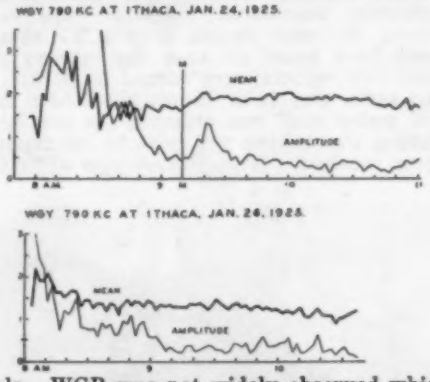
A. The Pickard Test

Dr. Pickard had, for the purposes of this test, arranged a network of transmitting stations and receiving observers. The system is shown in the map reproduced in this article. Of the stations shown WGR, WBZ, WGY and WEAF were also being used by the observers for the *Scientific American* test (test C). Therefore these stations were using the "timed readings" arranged by the *Scientific American*. WTAP (the portable station of the Edison Light Company of Boston) was operating on board a vessel somewhere off New Bedford. She was working at 240 meters and sending special



scheduled material. 2XI at Schenectady was sending a special schedule through the courtesy of Mr. B. R. Cummings of the General Electric Company. This was purely a key schedule and this fact, together with the fact that it was at 2150 kilocycles, probably accounts for the fact that this station was more extensively observed than any other in the test. WGR, Federal Tele-

phone & Telegraph Company of Buffalo, N. Y., was also sending a special schedule through arrangements with Mr. L. C. F. Horle. They were operating with 500 watts in the antenna, sending C.W. and I.C.W. alternately for 15 minutes period. When using I.C.W. a 1000-cycle tone was used with 20% modulation. The station signed with the key at five minute inter-



vals. WGR was not widely observed which is very regrettable as its range was apparently national, several excellent reports having been received from the West Coast.

The Broadcast Waves

What happened on the broadcast wavelengths is much better shown by Dr. Pickard's curves than by any amount of talk that can be set down here.

The Experimenters Section

Probably because the notice was very late the Experimenters Section did not contribute anything particularly useful to these tests excepting in the case of 2XI.

2XI

Station 2XI must be mentioned separately because more reports were obtained from it than from any other station in the entire Test A system. With the exception of an exceedingly erratic curve obtained at Chikasha, Oklahoma and a reverse curve obtained at Toronto, the results from 2XI are exactly like the average curves given by Dr. Pickard.

The A.R.R.L.—Scientific American Tests

By C. A. Service *

About 150 reports on the A.R.R.L.-S.A. tests were received. Of these 50 could be used as being sufficiently accurate.

Bad interference from non-testing stations was experienced by majority of recording stations.

Unusual phenomena were not experienced by observers generally. Some reported sudden static, frying noises, mush or crackling at time of totality but this may have been due to the use of electric lights, an increased line voltage or power leak. During totality a number also reported fading out of transmitting station and fading in of one or more stations on the same wavelengths.

* Asst. Secy., A.R.R.L.

40 Meter Band

1CKP was only station heard and only two recorders reported. Both reports differed diametrically.

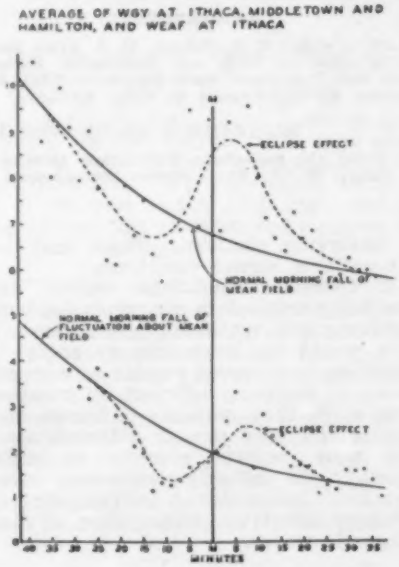
75-85 Meter Band

In general, observing stations agreed on a decrease in signal strength beginning or during totality. Some reported general increase in strength a few moments after totality, others placed 5 minutes after totality as the time of return to normal strength. Majority experienced fading, in some cases severe at time of totality.

In some cases, signals held steady through totality, with decrease immediately following; possibly due to incorrect timing of recording stations. One exception to general fading during totality was c9AL, who showed increase with three observers, decrease with one and steady signals with two, decreasing after totality.

150-200 Meter Band

In general, observers reported increase in signals during totality. Not as many reports received from observers in this band. Normal amount of fading present to the same extent and with the same variations as noted in the 75-85 meter band.


AVERAGE OF WGY AT ITHACA, MIDDLETOWN AND HAMILTON, AND WEAF AT ITHACA
ECLIPSE EFFECT
NORMAL MORNING FALL OF MEAN FIELD
NORMAL MORNING FALL OF FLUCTUATION ABOUT MEAN FIELD
ECLIPSE EFFECT
MINUTES

Conclusions

Sufficient reports on the 40 meter band were not received and those tabulated are contradictory; no conclusions can be drawn.

Reported observations on other wave-

lengths indicate in general that a decrease in signals during totality took place in the 75-80 meter band, an increase in the 150-200 meter band. This leads to the general assumption the latter band is best for night work, the former for daytime. However, there are certain offseting factors which must be considered as influencing day and night transmission:

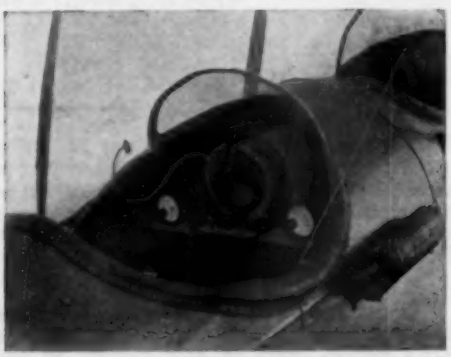
1. Both observing and transmitting stations were not simultaneously in the eclipse shadow. Sunset and sunrise effects might be expected.

2 Observers were not equidistant from transmitters nor were weather conditions similar everywhere. Wide temperature and barometric differences existed over the field

ten times as powerful as the other. Many other stations in the upper and next to the upper amateur band, (150 to 200 and 75 to 80) were heard almost not at all. The only one of them that in any way compared with 9AND was 8DAJ at Niagara Falls. The answer lies probably in the fact that these three stations were almost exactly at 75 meters and that there is where most of the listening was done. Certainly the very strong 40 meter signals from 1CKP should have been heard all over the country yet only two reports were turned in on it. In the same way it is known absolutely that 150 meter stuff was crossing the continent during the eclipse yet next to no reports were received. It just illustrates again the

THE OBSERVERS

Left to right: G. M. Palmer, U. S. Army Instructor attached to 109th Air Observation Squadron; Tech. Sgt. Dan Foote, same Squadron; Hugh S. Mc Cartney, 9DWO; Howard O. Kelly, 9CCX.



THE TRANSMITTER

5-Watt Tube in coupled Hartley circuit with one-turn loop for modulation. 315-volt Burgess "B" Batt. on plate and 12-volt Willard Battery on filament. Remodeled from 9DWO set.

MINNEAPOLIS GROUP WHO REPORTED THE ECLIPSE FROM THE AIR

Using the radiophone transmitter pictured above they described what they saw from above the clouds to station WCCO; which station rebroadcasted their reports to listeners on the broadcast waves.

of observing stations. These may cause non-uniform signal variations.

3. Overhead conditions varied; cloudy weather prevailed in many places, both at receiving and transmitting stations.

It would be impossible to apply these variables to observed results as correctives, as we do not have sufficient information on how much they normally influence signals during the year nor at different seasons, nor were reports received in sufficient quantity to afford conclusions whether weather, barometer, temperature, etc., strongly affect the propagation of electromagnetic waves.

9AND

Just as 2XI stood out in the Pickard test so 9AND stood out prominently in the *Scientific American* test. This is particularly peculiar as one station was more than

attitude that the average amateur has of not getting off the wavelength that he is used to. This is either regrettable or irritating, depending which way you wish to look at it.

Our Many Troubles

More than half of the reports received had to be thrown out because some important thing had been omitted. Many of the stations did not put down the date on which they made their tests. Of course we could suppose that they did it on the day of the eclipse but there was no way of telling and these things simply went into the discard. The chances were that a fellow so careless as not to date his observations would not remember when he made them, therefore there was no use in writing.

The biggest single trouble we ran into was that infernal nuisance, the jackass who

called CQ instead of taking part or else keeping quiet along with the organization. Since everybody knew through *QST* that there were going to be official tests we have nothing but contempt for the man

who smeared them by the silly business of calling CQ during the tests. There were many of him but we despise the entire lot.

In addition to the stations who were calling CQ much interference was manufactured by other stations running tests of their own concerning which we had not been informed. We did not particularly mind. The tests that were run by 8XK and 9ZT seemed to be of an orderly nature, though they did break up our own tests. However, something should be said at this place against three stations, a 1, an 8 and a 3. The first of these stations was going with a very strong signal having a terrific ripple and a wave that wabbled five meters. Dozens of our records were damaged by them. Even worse were the 8 and the 3 who apparently were tuning their transmitters back and forth during the test. As far as we could make out none of these last three were running such a thing as an organized test but they did between them manage to spoil around in the neighborhood of 1-3 of all the records which we received.

Freak Ranges

Because everybody insisted on camping at 75 meters, most of our reports are on this wavelength. However it seems that not only the 75-meter band but also the 200-meter band and the broadcast-band temporarily acquired almost full night-time ranges. We have mentioned that WGR was copied well on the West Coast. Several reports have come in of California and Washington stations being copied on the East Coast. In the two amateur regions any number of Sixth and Seventh District stations were copied on this coast and it is fair to assume that this worked both ways although we have few reports from the West on this particular point.

Thanks to the Traffic Department

Mr. C. S. Taylor, Assistant Division Manager for Western New York, gave material assistance to the tests. He put us in touch with several amateurs through New York State and also through the assistance of Mr. William E. Bostwick, City Manager of Ithaca, and Mr. J. T. Briggs of Cortland, New York, saw to it that there was no amateur interference in these regions. We only wish that the same thing had been done over the entire Eastern half of the country. The tests would certainly have been much more valuable.

The Nervous Bird

Something like a quarter of all the reports received were absolutely and hopelessly worthless because the men working the reports had ignored instructions entirely. Instead of getting on one station and staying there they hopped around like a spider on a hot stove. The result was that instead of turning in a report they turned in an envelope full of hash which was absolutely worthless to them, to us and to everybody else. Apparently these fellows do not realize that the instructions issued on a test of this kind are not simply an attempt to show authority. The instructions have been carefully and painstakingly worked out for weeks in advance and there is a reason for every one of them.

Conclusion

There we have it. The *Scientific American* test will be analyzed later. The Pickard test will also be gone over in greater detail, our own tests have already been analyzed. We have learned something about the eclipse and we have learned something about tests also. We know most certainly that if we ever run a test again we are going to load the shotgun and sharpen the axe before starting.

In our last issue we reported the cruise of the "Kaimiloa", KFUH, at this writing reported somewhere between Fanning Island and Christmas Island. We now learn that the "Kaimiloa" is on a short preliminary cruise to last some four months, after which she will return to Honolulu, where active steps will be taken to equip the vessel with a first-class ham set. On the extended cruise then to follow, there will be ample opportunity for real DX traffic work.

8ACY says that 8UH has obtained a storm and strife with the insane idea of making an OW of her. We think it would be a much nicer idea to make her a YL. At any rate the Mrs. can do ten words per already.

Do You Want Callbook Supplements?

THERE is a good chance that the Department of Commerce can be induced to publish a monthly supplement to the "List of Amateur Radio Stations of the U. S.", listing all additions, changes and deletions occurring in the previous month, so that up-to-the-minute information would be available from the Government Printing Office on annual subscription at a reasonable cost. We know this is good news.

The matter is not as simple as it sounds. The money paid to the public printer for government publications goes direct into the Treasury and does not help the government department which had the job done. The price of such publications is low because the cost is figured only on the extra copies that are to be put on sale and the big cost of starting the job is charged against the department, in this case the Department of Commerce. Unfortunately the printing appropriation of the Department of Commerce is none too big for their needs, and they must be wholly convinced of the desirability and genuine need for a publication before they undertake it. The job before us amateurs is to convince them.

It has been proposed that these supplementary listings be included in the "Radio Service Bulletin", a monthly publication of the Bureau of Navigation which already gives such information on commercial, broadcasting and experimental stations, and which is at present available from the Superintendent of Documents, Government Printing Office, Washington, on annual subscription at 25c per year. Much miscellaneous radio information of value is included monthly, and every radio amateur ought to be a subscriber anyway. If changes in the amateur list were included in the R.S.B. it would be necessary to increase the subscription price slightly, but it would probably still remain below 50c per year. We have told the Bureau of Navigation that we believed that if amateur listings were added to the Bulletin, between 5,000 and 10,000 additional subscribers would result. Did we exaggerate? We don't believe so, but we must find out. Please help us.

Will every reader of *QST* who is interested in this subject make it his business to sit down immediately and write A.R.R.L. Headquarters about it, answering these questions: Do you think there is a real need for monthly supplements to the amateur callbook? In view of the Administration's present program of economy, do you think the Department of Commerce would be justified in the additional expense (estimated around $2500 per pear)? *Will you subscribe for such a supplement as described?*

The next move in this matter must now come from the membership. Write us those letters. We know you want this thing but we must have letters to prove it, letters that we can take down to Washington and dump on the desk and say "There! That's what the A.R.R.L. membership says about this thing. Ten thousand of us say we need it and are anxious to subscribe. Can we have it?"

And make it snappy, gang, so we can get going on it.

—*K. B. W.*

Radiomen Being Enrolled in U. S. N. R. F.

THERE are indications of much interest in the amateur world over the announcement that the Navy is desirous of enrolling six thousand radio operators in Class 6 of the Reserve Force, first published on Page 20 of *QST* for February. It is a splendid opportunity to help our Navy, one of the kind of chances we watch for, offering experience of immense value.

Some more data on the qualifications,, ratings, etc., are now available:

Ex-Service men with honorable discharges will be considered eligible, if qualified, for enrollment in the Reserve in ratings not lower than those held upon discharge, and these men in general will be given preference over others in enrollment.

Candidates holding operator's licenses from the Department of Commerce will be considered eligible provisionally for enenrollment, and generally will be enrolled without examination other than physical in ratings as follows: Extra first grade commercial license, Chief Radioman. First grade commercial license, Radioman First Class. Second grade commercial license or first grade amateur license, Radioman Second Class. Second grade amateur license, Radioman Third Class.

Provision will be made for examinations for promotion, and those found qualified

will be promoted to the next higher rating.

A course of instruction is being prepared and will be issued in the near future, for the training of the Communications Reserves. Short-wave apparatus will be installed soon in the headquarters of certain of the Naval Districts and used in teaching amateur operators the Navy procedure and in keeping in touch with them and gauging their ability and progress.

No drilling or cruising is required of Class 6 Reservists but a limited number can be given an anuual 15-day cruise upon application.

All interested amateurs should communicate at once with the Commandment of the nearest Naval District, the complete list of which was published on page 20 of February *QST*. A quota has been assigned to each District and no enrollments can be made after the quota is filled.

—*K. B. W.*

The Michigan State A. R. R. L. Convention

THE Fourth Annual Michigan Convention at Lansing opened on the afternoon of February 13th (Friday, too) with a general organization meeting held in Engineering Hall, Michigan Agricultural College. Brief talks were given by *QST* Circulation Manager, D. H. Houghton, representing League Headquarters; Central Division Manager R. H. G. Mathews; District Superintendent Pancost of Lansing, and others. Convention Chairman Barnwell presided.

In the evening a combination BCL-Ham meeting was held, with D. S. Pancost as Chairman, at which addresses were made by A.D.M. Darr of Detroit, Radio Inspector Browne of the Eighth District and Division Manager Mathews. Considerable discussion ensued with the object of smoothing out BCL-Ham difficulties.

After the meeting a cross-examination was conducted under the direction of A.D.M. Angus of Indiana, rather a stern looking individual, his victims being three Lansing eighths, accused of malicious *QRM* etc. The unfortunate three were inclined to take the questioning quite seriously, possibly indicating guilty consciences, but at the end a prize of a Jewell T.C. Ammeter was awarded for the best replies to the questions.

On Saturday morning a very interesting trip was scheduled, taking in amateur stations as well as the two Lansing Class "B" Broadcasters, WREO at Reo Motor Car Company and the M.A.C. station.

In the afternoon a combination A.R.R.L. and technical meeting was held. A.D.M. Darr, D.M. Mathews, D. J. Angus and D. S. Pancost spoke. Chairman Barnwell presided.

Saturday evening came the big banquet at the Elks Club and for pep it certainly equalled any ever held. Toastmaster Barnwell introduced the speakers—Houghton, Darr, Wilson, Fallain and Mathews. A spark set and spotlight, serpentine confetti, horns and hats added to the festivities, as did some novel stunts conceived by D. S. Wilson of Kalamazoo and executed by his gang with the aid of Marquis of Chicago. Marquis and Wilson had a terrific and mysterious argument, the cause of which finally was discovered to be the proper way to dress a doll. Hi!

The R.O.W.H. initiation, put on by the Supreme Council from Flint as only they can do it, completed the convention. D.M. Mathews was surprised with the presentation of the jewel denoting membership in the new Grand Order of the R.O.W.H. which will be put on for the first time at the next National Convention at Chicago.

The Fourth Michigan Convention passed into history and Lansing has the compensation of knowing they have made a good job of it.

—*R.H.G.M.*

We owe an apology to Mr. R. P. Farrington of 7AKK, 592 E. 40th N., Portland, Ore. He was the author of the article "Rectifiers and Filters" which appeared on page 29 of the February issue. We much regret the typographical error which resulted in the omission of his name.

Third District Convention

We have just received definite notice that owing to conflicting convention dates the Executive Radio Council of the Third District has decided to postpone the Third District Convention until next fall.

New Rules for A. R. R. L. Conventions

AT THE ANNUAL meeting of our League Board of Directors held in February, much thought was devoted to A.R.R.L. Conventions. Just what is an A.R.R.L. Convention? Who can hold one? What safeguards are there to make sure that League policies are followed? What can we do to create a situation whereby our members may know that a convention advertised as an A.R.R.L. affair is actually that? There were many more questions of this kind, because in the past these things have never been defined and almost any get-together was an "A.R.R.L. convention" because it was impossible to bring a large number of amateurs together without finding them overwhelmingly A.R.R.L. members. The subject needed systematizing, and as a result four new by-laws were adopted, reading as follows:

Conventions

40A. *An American Radio Relay League convention is defined as a meeting of persons interested in amateur radio, of any regular American Radio Relay League Division as specified in By-Law 4 hereof, when such meeting has been authorized and is conducted as hereinafter provided.*

40B. *Neither the name of the American Radio Relay League, nor the initial letters thereof, nor its emblem, shall be used in connection with any meeting or convention, or in the advertising thereof, save such as above defined.*

40C. *Before such a convention is held, the parties desiring to conduct the same shall obtain the approval of the Executive Committee, who shall act with the advice and consent of the Director of the division in which the convention is to be held. To this end there shall be submitted to the Executive Committee a statement setting forth the place and date of the proposed convention, the territory to be embraced, and the particular purpose to be served thereby. The Executive Committee may call for any other information necessary to make its decision. The management and plans of every such convention shall be subject to the approval of the Director of the division in which the convention is to be held.*

40D. *The above sections shall not apply to national conventions, which shall be under the control and direction of the Board of Directors.*

The basic idea in these regulations is to foster division spirit. The division is the unit in A.R.R.L. organization, neither states nor inspection districts having been found satisfactory areas. Why then should there be A.R.R.L. conventions that take in parts of several divisions or that leave out parts of a division? There shouldn't be! Our Board wants our conventions to be Division Conventions, under the direction of the Division Director and with the co-operation of the other local officials. This means the end of A.R.R.L. inspection-district conventions, and it means no more A.R.R.L. state conventions, although of course there is nothing to prevent the holding of a series of division conventions in the same division with the scene of activities in a different state each time. The important thing is that all such conventions must especially invite the entire division, their management and plans must be approved by the Division Director, and Headquarters approval, given with the advice and consent of the Director, must be secured before any such affair can be called an A.R.R.L. convention.

Another convention feature considered by the last Board meeting related to the ownership of papers delivered at conventions, concerning which the following resolution was adopted.

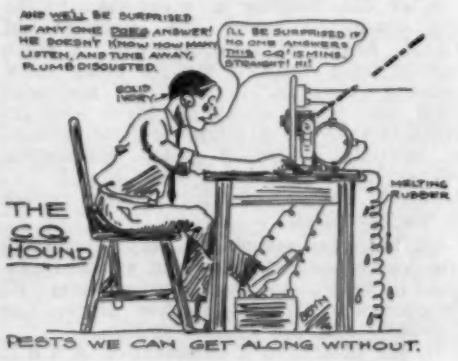
Resolved, that, in accordance with general engineering practice, papers read before a convention of any part of the A.R.R.L. shall become the property of the A.R.R.L.; and that A.R.R.L. convention managements are instructed so to inform authors when papers are solicited.

Managements of A.R.R.L. conventions should forward to Headquarters all papers read before conventions, so that they may be available for publication in *QST*.

All persons interested in conducting A.R.R.L. conventions are requested to take careful note of the foregoing and to govern themselves accordingly.

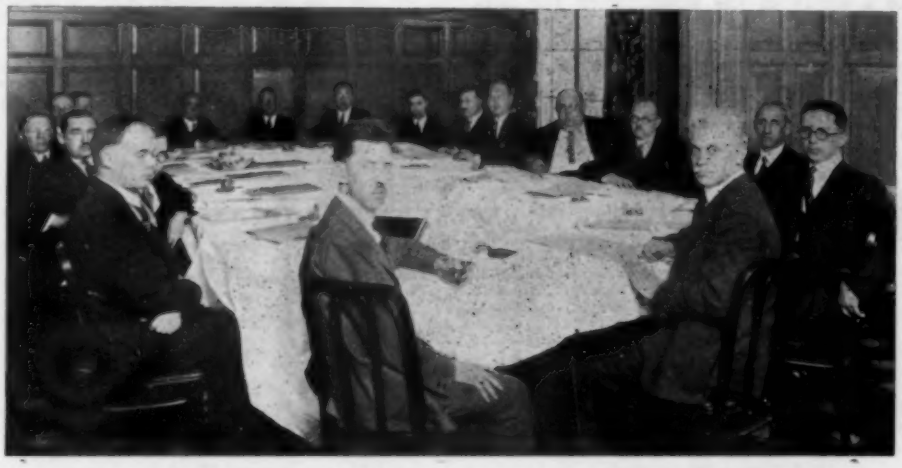
—*K. B. W.*

Ballantine is again available—the publishers having reprinted the third edition. Remember, six subscriptions to *QST* gets a copy. See page 100 of the February issue.


AND WELL BE SURPRISED IF ANY ONE DOES ANSWER! HE DOESN'T KNOW HOW MANY LISTEN, AND TUNE AWAY, PLUMB DISGUSTED.
ALL BE SURPRISED IF NO ONE ANSWERS THIS CQ! IS MINE STRAIGHT? HI!
SOLID IVORY
MELTING RUBBER
THE CQ HOUND
PESTS WE CAN GET ALONG WITHOUT.

The Annual Meeting of the A. R. R. L. Board

THE Board of Directors of the A.R.R.L. met at Hartford on February 6th and 7th in regular annual session, the second of those truly representative Board meetings which are now assured under our new constitution. Mr. L. D. Wall of San Antonio was alternate for Mr. Corlett, and Mr. Gravely was prevented from attending at the last moment by illness in his family; all the other directors and all the League officers were present. With stops for meals the meeting ran from 10 in the morning until 10:30 at night on both dates, with a total time of the sessions of almost twenty hours. The following resume of the Board's actions is published for the information of the membership.



THE A.R.R.L. BOARD IN ANNUAL SESSION FEBRUARY 6TH AT HARTFORD

The annual reports of all the League's officers were received and approved. The acts of the Executive Committee since the previous Board meeting were ratified and approved, including the granting of seven months' leave of absence to Traffic Manager Schnell in order that he might accept active duty in the Navy with the Fleet during the summer manoeuvers, as reported elsewhere in this issue.

Ten clubs were affiliated, as will be reported elsewhere, and the Executive Committee was authorized to grant affiliation between Board meetings, under the usual conditions.

Papers read before A.R.R.L. conventions were declared to be the property of the A.R.R.L., and the attention of convention managements is invited to a separate report thereon appearing elsewhere in this issue.

A resolution was adopted pledging League co-operation to the coming Hudson-Division A.R.R.L. Convention.

The Executive Committee was named as a committee of judges to award the Hoover Cup for 1924 in the name of the Board.

Four new by-laws were unanimously adopted to define A.R.R.L. Conventions and state the terms under which they may be held. They are published elsewhere in this number, and the attention of all amateurs interested in League conventions is directed thereto.

President Maxim was appointed as our representative at the Paris I.A.R.U. Congress, with plenary powers, to be accompanied by some other member of the League to be selected by the Executive Committee. Our representatives were instructed to forward the principles of the A.R.R.L. in the proposed I.A.R.U., to the end that the I.A.R.U. may become an international co-operative body devoted chiefly to the co-ordination of two-way international amateur communication and experimentation attendant thereto.

At the request of Cuban amateurs, the by-laws were amended to include Cuba and the Isle of Pines in the Southeastern Division.

Long consideration was given the prob-

lem of interference, particularly the imminence of restored quiet hours on short waves, and the Board went on record as opposed to the institution of any quiet hours on the waves below 85 meters.

It was agreed that another meeting of the Board would be held at the National Convention in Chicago in August if the condition of the treasury made it possible.

The publication of an amateur call-book by the League was regarded as impracticable and it was decided to take the subject to the Department of Commerce and ask for the publication of regular supplements; see separate article thereon in this issue.

A committee consisting of Messrs. Jansky, White and Babcock was appointed to make a study of the possibilities for having an A.R.R.L. Laboratory, with instructions to bring in a comprehensive working plan at the next meeting of the Board.

The possible desirability of moving League Headquarters westward was considered; and it was voted, without dissenting voice, to be undesirable.

The Board considered Traffic Department affairs at length. A high-powered Headquarters station, capable of working regularly on schedule to any part of the United States and Canada, was authorized.

Appropriate resolutions were adopted on the death of Miss Margaret King, assistant treasurer of the League. Mr. C. A. Service, Jr., assistant secretary, was also appointed assistant treasurer.

It was voted to request of the Bureau of Navigation the allocation for general amateur communication of a band of 1,000 kilocycles somewhere between ½ and 1 meter, to aid amateur beam transmission development.

As part of the Secretary's report, financial statements were presented covering the quarters ended Sept. 30, 1924, and Dec. 31, 1924, from which the following statements of revenue and expenses are published for the information of the membership, in accordance with instructions of the Board:

STATEMENT OF REVENUE AND EXPENSES

REVENUE	Quarter ended Sept. 30, 1924		Quarter ended Dec. 31, 1924	
Advertising sales	$17,180.97		$24,767.65	
Newsdealer sales	7,480.24		21,681.06	
Newspaper syndicate sales	2,808.50		2,888.50	
Dues and subscriptions	6,455.14		10,235.12	
Back numbers, etc.	729.09		772.07	
Emblems	329.00		527.00	
Interest on bank deposits	140.39		106.27	
Bad debts recovered	31.22		43.16	
		$35,154.55		$61,020.83
DEDUCTIONS				
Returns and allowances	1,712.85		2,757.19	
Add reserve for returns	655.74		3,185.42	
Exchange and collection chgs.	1.58		.79	
Discount 2% for cash	227.02		333.99	
		$2,597.19		$6,277.39
Net Revenue		$32,557.36		$54,743.44
EXPENSES				
Publication expense	$11,504.76		$22,384.10	
Salaries and commissions	12,856.97		14,511.52	
Newspaper syndicate expense	579.33		582.98	
Forwarding expense	656.78		643.94	
Telegraph, telephone and postage	1,608.15		1,918.05	
Office supplies and general expense	2,551.67		2,920.56	
Rent, light and heat	377.12		588.72	
Traveling expense	1,681.62		957.27	
Depreciation on furniture and equipment	125.17		127.95	
Bad debts written off			216.98	
Traffic Dept. field expense	502.79		613.29	
Publicity Dept. field expense	19.78		51.82	
		$32,464.14		$45,517.18
Net Gain from Operations		$93.22		$9,226.26

A COMPLETE DETAILED DESCRIPTION OF A SYSTEM FOR THE TRANSMISSION OF PICTURES BY AMATEUR RADIO!
It will be in the
MAY ISSUE OF *QST*

The Amateurs' Test Table

By L. W. Hatry, Department Editor, QST

THE amateur inclined toward experimentation generally finds that he has a certain amount of reluctance to overcome before he cares to tear things up and try something else— unless he keeps things torn up continually. Either way is inconvenient. If you want to have a station, it is certain that there is little satisfaction in it if it is continually in pieces. However, there is a convenient way out and that is to have a separate small table for tests; or else have a separate part of the operating table.

The first necessity is power supply; the A battery, the B battery, the 110-volt line or else terminals for the filament and plate supply. These must be easy to get at and change. A possible arrangement on the table is shown in Fig. 1. This can be made more complete or on a smaller table; one set of terminals for the batteries will be sufficient. The 110-volt terminals should be fed through a fuse block as a means of protection of the home illumination.

The problem of terminals is a real one. They can be binding posts which provide a very good arrangement, but which are not always easy to obtain nor entirely inexpensive. Fahnestock binding posts are the handiest. A simpler set of terminals can be made of 8-32 machine screws. The round nuts on dry cells will furnish the tops to complete these into binding posts. These terminals are best arranged on strips of some sort. These strips can be scrap bakelite or wood. There is no need of extreme insulation in the case of the batteries. They

FIG. 2

can be mounted directly on the table itself just as easily as not, and would be just as satisfactory. Your own taste should be your guide in the matter.

The terminals for the antenna and ground are simple to install. The antenna arrangement consists of a wire stretched between a couple of wood uprights. For reception experiments the wood uprights will give sufficient insulation, but for transmission this is doubtful, and glass or porcelain insulators should be employed. A single-pole double-throw switch should be used to change over to the test table, or a flexible wire with a clip on it used to connect to the regular aerial. This wire can have on it three or four Fahnestock spring binding posts for convenience, or, if you use the clip-terminated test wires, there is no need for binding posts on the wire. The wire should be tinned because plain copper will corrode. The paper clip connectors work excellently on a wire, too. The

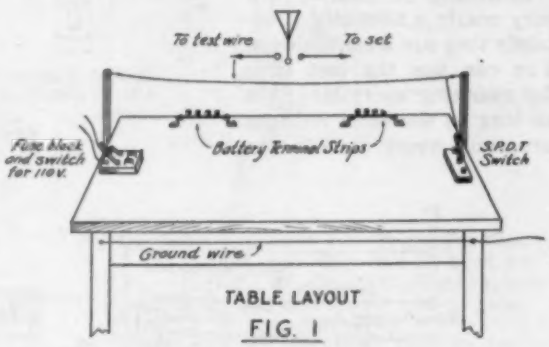


TABLE LAYOUT

FIG. 1

ground can be a wire on the front end of the table and, of course, need not be insulated. The counterpoise should be on the front of the table too, but is liable to need insulation. Putting these, the ground and counterpoise, on the front of the table gives fairly good separation between them and the aerial.

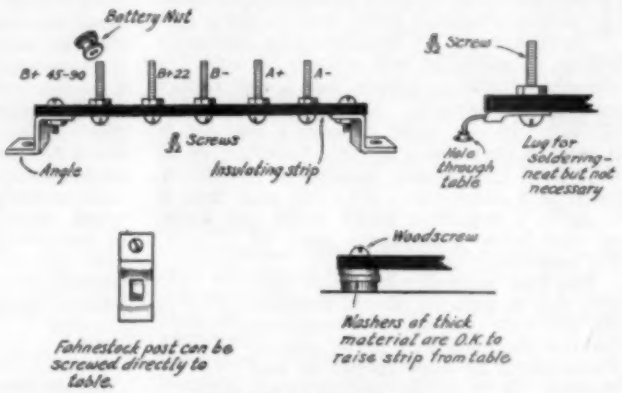
Test-Wires

With these it will be most convenient to have a set of test-wires with a clip on either end. These clips can usually be obtained at a five-and-ten-store or at a mail order house at about five cents each or less. The test-wires should be in several lengths; quite a few one-foot lengths, a few two-foot lengths, and some three-foot lengths, the quantity to be determined in the usual fashion by the pocket-book. The ordinary paper clip is not a bad test clip, especially if your terminals are arranged for it. A suggested terminal for it is shown in Fig. 2, A and B. 2B is made from another paper clip, the wire of which is sufficiently stiff for the purpose. The wire to be used in these test-wires must be flexible. The easiest to obtain is ordinary lamp cord. It should have its loose outer braided covering removed, as that only tends to fray and get

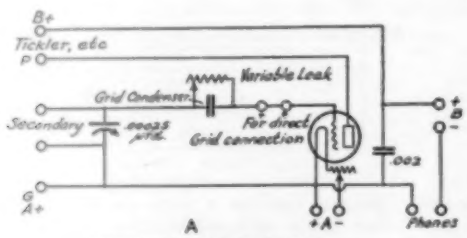
in the way. Fixture wire of the stranded type is first class for the purpose, but is generally not so cheap as lamp cord. The fixture wire is obtainable in a number of colors, and is therefore very convenient in tests, because you can color-code your connections. You can make the A battery leads of one color, and the B leads of another, which prevents confusion and its consequences. You will find these test-wires extraordinarily handy.

Use for Switches

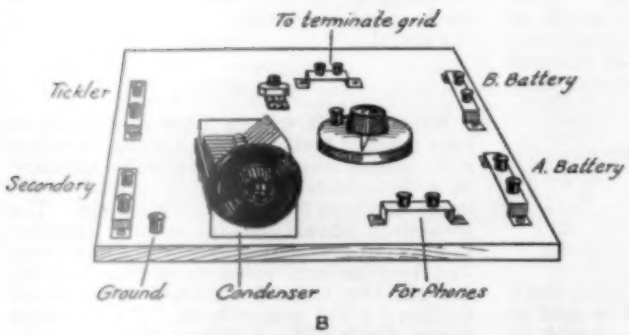
Switches, of course, are very nearly a necessity. Certainly they are a convenience. You can use the test clips for changing everything, but as long as the same changes are made every time in the case of the batteries and the antenna system, the more permanent switch would be preferable. The antenna should be connected through a single-pole double-throw switch. So should the counterpoise. The batteries need two double-pole double-throw switches and a single-pole double-throw, unless you do not use the two different values of B positive supply on the terminal blocks. If the negative of the B battery alone is changed over it is not so important that positives be disconnected from the set. The negative is connected to the A positive usually in the set and then to ground, which makes an excellent possibility for a short. The positives terminate at the plates of the tubes so that with the tubes off they are sufficiently insulated.



TERMINAL STRIPS
FIG. 3



A
CIRCUIT OF TEST BOARD



B
POSSIBLE LAYOUT OF TEST-BOARD
FIG. 4

Other Conveniences

It is not a bad idea to have a rheostat screwed directly on the table connected in the A battery line. The rheostat can be one of the sixty-ohm quarter-ampere type that will satisfactorily control any type of tube except the one ampere detectors. Also, as long as most of us have lying around one of the old six-ohm rheostats, that may as well be connected in also, in case we wish to fool with a one ampere tube, or with several of the quarter ampere "A" type, that can be controlled by a single rheostat. See Fig. 6.

A Test Board

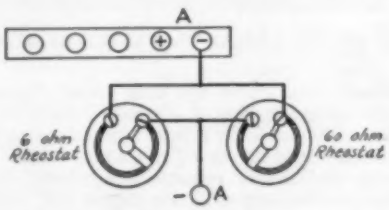
Another thing very handy to have is a permanent test set up that can be used for hook-up experiments. This need only consist of a socket, rheostat, variable condenser, grid-leak and condenser, and phone condenser. Binding posts should be used plentifully, as they are what make such a

Fahnestock Posts on aerial wire make handy quick test terminals

Ordinary Paper Clips make excellent test clips

FIG. 5

board really useful. The circuit is shown in Fig. 4A, and the possible arrangement of the parts in Fig. 4B. You should use your own arrangement, for, no doubt, you have your own ideas on the subject. The added terminals at 1 makes it possible to tie directly to any element of the tube it-



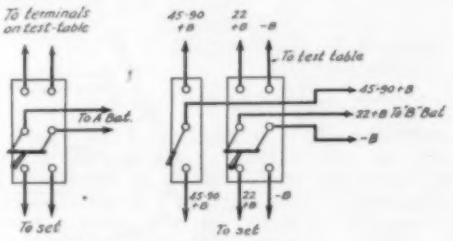
Rheostats In Circuit With "A" Battery, Either can be "OFF" When The Other Is In Use

FIG. 6

self, for the other elements are connected to the various other terminals. It is often necessary to connect direct to plate or grid.

Meters

Things that are not necessities but which are more than useful are meters. It is not necessary to have accurate meters in most cases, as the desire is generally for comparative readings. Anything that will work for the purpose, has a scale and is portable will do. The ordinary low-priced pocket voltmeters and ammeters are handy and within most fellows' finances. They can be used for the A battery, the B battery, for transmitting filament voltmeters and as plate milliammeters. The method of using them for the two last named things is told about on page 59 of the September, 1924, issue of *QST**. A 6-volt meter with 30-ampere scale in addition and a 50-volt meter are the most necessary instruments.



SWITCH CONNECTIONS

FIG. 7

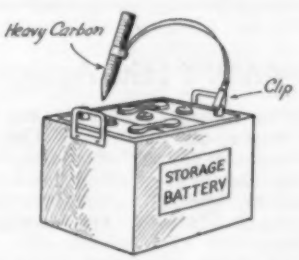
By the time you have found use for them in all the places that they can be used you will have thought of about six other meters that you could use and would like to have.

* Obtainable from *QST* Circulation Dept. for twenty cents.

A Soldering Trick

THAT there are more ways than one to kill a cat has long been an axiom; herewith we help verify the fact. An ordinary pencil, properly doctored, plus a storage battery, will do excellent soldering.

The sketch shows the method of connec-

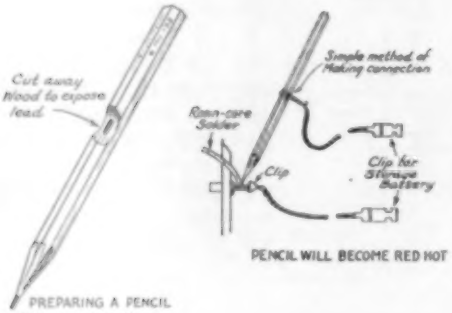


AS USED IN BATTERY SERVICE STATIONS TO BURN ON LUGS, ETC., FOR A NUMBER OF YEARS

tion and use. The battery current is passed through the pencil lead heating it red-hot, which, in turn, heats the joint to be soldered

and melts the solder. This, like the use of the soldering iron, requires a certain knack for success that is only acquired through trial; so don't be disappointed with a few failures. Self-fluxing resin core solder should be used.

These things you should know: Make the distance the current has to travel through the pencil lead rather short so that sufficient current will pass to heat the lead; otherwise the lead's resistance will be too



PREPARING A PENCIL FOR SOLDERING

high. To avoid such an occurrence, make your connection close to the point—about an inch away. Use only soft lead pencils, No. 2, HB, etc., as the hard leads heat up and burst with a sharp crack. The better the grade of pencil, the better it works. In using the metal magazine pencils, be certain to use a sufficient length of pencil lead to avoid overheating. Also, generally, the metal pencil body will heat somewhat.

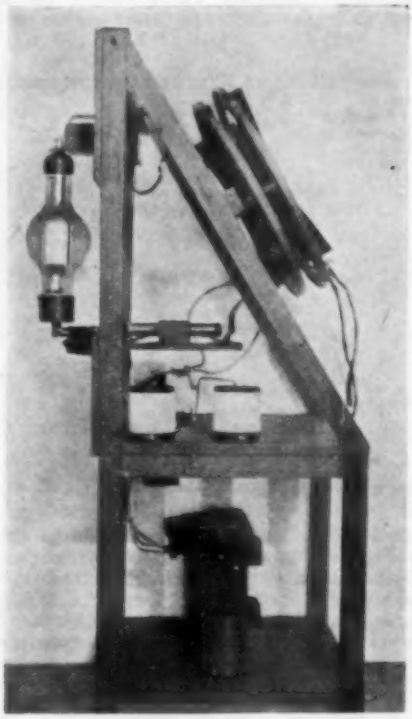
Don't worry about the load on your storage battery as it is not heavy. It may run as high as ten amperes but generally stays in the vicinity of two to five amperes.

—*L. W. H.*

6AWT Hits Again

6AWT continues to star as the leading performer on the West Coast. His latest feats consist of connecting with Japan for the first verified hook-up with that country, special communication with U. S. Naval Stations, and contact with Indo-China.

JA2 of Nagasaki, Japan, was worked February 2 at 11:30 p.m. P.S.T. It is the station of the Imperial Naval Academy and has a power of 20 k.w. 6CHL worked JA2 on Feb. 6th., and 6AWT reports last communication on Feb. 9th., when the station quit working amateurs. It was installed by the Telefunken Co. and it was only while being tested that it was possible for the station to communicate with our gang. HVA was first worked by 6BCL on Feb. 3rd at 7:40 a.m. and on Feb. 4th 6AWT



ONE OF THE LATEST TRANSMITTERS AT 6AWT

worked him. The QRA is Chief Fournier, Radio Service, Hanoi, French Indo-China.

In addition 6AWT has worked more Australians and New Zealanders than any other station; is reported regularly as the most consistent and strongest by the A's and Z's; has been heard in 34 countries, and has worked twelve of them. Then the Naval Station at Manila reported him as the best station on the coast and tests were arranged, he to shoot messages to NPO on his regular wave, 80.5 meters, and NPO to answer through NPG because NPO must use 1400 meters. These tests were a whale of a success, as NPO copied 6AWT solid. The U. S. station of Guam, NPN, also reports hearing 6AWT.

It will be remembered sometime ago that we reported 7HG working JUPU, in Japan supposedly. This was never verified so we feel that 6AWT has a claim to the distinction of being first to work that country.

—*L. W. H.*

Fair Warning!

THE following letter puts it directly up to us that we American amateurs are not making good on our promises to our government. Not only are all manner of ragged plate supplies being used but in addition to this stations actually have the impudence to use direct coupled transmitters, even during the evening when broadcast programs are being listened to.

The men who do such things are inviting trouble for the entire amateur transmitting game. If you don't believe it read the following letter which we have just received from the Department of Commerce.

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
WASHINGTON

Refer to
FILE NO. 2986-N/R

February 10, 1925.

American Radio Relay League, Inc.
Hartford, Connecticut

Sirs:

The Bureau is receiving reports from several of its supervisors with reference to the serious interference with radio broadcast reception caused by amateur transmitters on wavelengths below 85 meters.

This interference has become so serious that some of the supervisors have recommended that the quiet hours now being observed on wavelengths from 150 to 200 meters be applied also to the shorter wavelengths.

Officials of the American Radio Relay League have represented to the Bureau that it is possible for the amateurs to so construct their stations as to prevent interference with radio broadcast reception even in the immediate vicinity of the stations.

It was in view of this claim that the regulations were drawn permitting the amateurs to use the short wavelengths during the silent hours.

If the amateurs can so construct their transmitters as not to produce interference during the silent hours and fail to do so they will of course not be permitted to use their stations during this period if interference results and if the situation gets worse as it apparently is getting it may be necessary to amend the regulations requiring the amateurs to observe the silent hours from 8:00 to 10:30 P. M. and on Sundays during church services when they are using wavelengths below 85 meters.

It has also been brought to the attention of the Bureau that many of the amateurs are not observing the regulations in using conductively coupled circuits instead of inductively coupled circuits. This is no doubt responsible for some of the interference we are getting.

This information is given you in order that you may immediately take steps to have the members of your league comply with the regulations and arrange their sets so as not to produce this interference.

Please advise the Bureau promptly what action you are taking.

Respectfully,
(Signed) *D. B. Carson*
Commissioner.

What We Must Do.

There you have it flat! The regulations of the Department are not a joke as a lot of you seem to think. They are meant to be obeyed and the Department is going to make it warm for the fellow that keeps on disobeying.

The regulations indicate very plainly that if you interfere with broadcast reception you are supposed to stop sending during the evening. Has anybody been doing this? Not so that you could notice it. The popular attitude seems to be that if you interfere with a nearby receiver all you have got to do is to supply it with a wave trap and make the owner work the extra control; then everything is lovely. *This is not so.* This is putting the burden on the wrong man. It isn't up to your neighbor to fix his receiver so you won't bother him: it is up to you to *fix your transmitter* so that you won't bother him. Cut down the power, use a loose coupled transmitter (loose, not merely inductive) and then go around *and find out from every man nearby if you are causing interference or not.* Then, *and then only,* are you on the right side of the Department's regulations.

Just at this point somebody will rise up and say "The regulations are not in accord with the law of 1912." That is correct, they are not. At the same time if we were going to run radio affairs by the law of 1912, there would be pandemonium in the ether today; everybody admits this. Hardly a radio station in America today is operating in accord with the law of 1912 because all of us have sense enough to realize it is obsolete and that the Departmental regulations are better. Since there is a gentleman's agreement to follow these regulations, anyone who deliberately violates them is automatically going to get himself into trouble. He is very definitely guilty of causing deliberate interference and for that his license can be taken away from him under the law of 1912. From this he has absolutely no appeal.

Don't try to wiggle out of it through that hole.

No Comeback Whatever

There isn't any excuse at all for these continued violations. We have been harping on the matter of good plate supply and good steady low power transmitters so long that we are getting sick of it. Very little effect has been noticed so far. Perhaps the Department's letter will jolt some of us out of this thing of trying to burn six kilowatts with a plate supply that would make the angels weep. When we do get over it, look over some of the following references.

"A Constant Frequency Set with a Record," page 19, January 1924.

"Low Power Loop Transmission," page 39, January 1924.

"The Improved S Tube Rectifier," page 47, February 1924.

"Some Characteristics of Electrolytic Rectifiers," page 67, February 1924.

"The Meissner Transmitting Circuit," page 18, May 1924.

"Practical Master Oscillator Sets," page 20, June 1924.

"Working at 20, 40 and 80 Meters," page 9, September 1924.

"A Five Watt Sending Set for $25.00," page 54, September 1924.

"Working at 5 Meters," page 13, October 1924.

"The Transmitter at 6CHX," page 39, October 1924.

"Making the 5 Watt Set Work," page 52, October 1924.

"Practical Short Wave Transmitters," page 44, November 1924.

"A Set That Works from 40 to 200 Meters," page 20, December 1924.

"Where Has Interference Gone?" page 35, December 1924.

"9APW's Five Meter Equipment," page 40, December 1924.

"Experimenters Section Report," page 31, February 1925.

"Some Radiophone Experiments," page 35, February 1925.

"Daylight Radio Communication Wins," page 9, March 1925.

"6TS and 2MU Across on 40 Meters," page 35, March 1925.

What We Must NOT Do

It doesn't make the slightest difference what wavelength he is on, the fellow who is using a direct coupled transmitter is on the wrong side of the regulations and should be reported and have his license taken away. He is a nuisance to broadcast receivers nearby and he is endangering the transmission game. If you know of such a fellow report him. It will be far better for radio as a whole to have a few dozen of these outlaws hung up than to have the whole game tied up with quiet hours which will cripple it.

If you know of a fellow who is causing interference to broadcast reception in his neighborhood, tell him about it. Nine times out of ten he does not know that such a thing is going on. If he is the right kind he will try to cure this by lowering the power, loosening the coupling or improving his plate supply or his method of keying. If he is the wrong kind, then the sooner we put him out of amateur radio, the better for everybody concerned.

Right at this point, we will admit that there are some propositions that are pretty hard to manage. When somebody is using a direct-coupled tuner such as the Radio Corporation's Radiola 3 and 3A it is certainly pretty hard to operate a transmitter anywhere nearby without creating some interference. We hope it will not be long until there are no such receivers left. However, that doesn't let the amateur transmitter out, he is still obligated to try to avoid interfering with them. One must also admit that it isn't fair to howl about direct-coupled receivers as long as some still use direct-coupled sending sets.

Plate Supply That Will Not Do

If it is kept in good shape, we know of no plate supply that is better than that obtained from an electrolytic rectifier with a good filter. However, if the filter is no good (we know of about 7 good ones in the entire United States) this certainly isn't true and in too many cases there is no filter at all and then to make matters worse the rectifier does not have enough jars. A rectifier that has fireworks in any of the jars will positively manufacture local interference. These things are little spark discharges inside of the rectifier. They are positive proof that the rectifier is not working decently and that it is making local interference.

As far as we have been able to find out there is one synchronous rectifier in the United States that really does not make any local interference. This is one that has a very carefully constructed disc and an elaborate filter. On the other hand we know of many synchronous rectifiers that are so horrible that they can be copied with a non-oscillating detector clear across America. They are not all at Los Angeles either; a number of them are on the Eastern Coast.

An "S" tube rectifier that has been operated too long so that the tubes have become hard is often difficult or impossible to filter. Don't try to use the tubes forever.

Motor generator sets are perhaps the very worst of all unless the filter is a very good one. It is extraordinary how hard it is to get this through the skulls of the users of radio sets. We have heard plenty of stations that sounded like a buzz-saw going through a piece of black gum just because the owner of the thing could not be made to put a decent filter on his generator. A gen-

erator turns out "direct current" but don't let anybody tell you that it turns out "continuous current." It doesn't.

As for the man that deliberately uses alternating current for his plate supply during the evening, *QST* will not print the kind of language that applies to him.

Keying

Good plate supply doesn's mean a thing if you have a rotten key thump. There isn't any excuse for this either. The thing has been gone into with great detail many times in our pages. Here are the references.

"Why Inflict Keying Thumps on Your Neighbor?" p. 29, July, 1923.

"Stopping the Key Thump," p. 39, July 1924.

You will dodge a lot of trouble by getting as far down on wavelengths as possible, 75 meters or less. You will dodge still more trouble by lowering your power and in the end you will dodge all the interference of any nature whatsoever by putting in the type of transmitter we are all going to use two years from now, the variety that was described in "Where Has Interference Gone?"

Photographs for QST

FROM the looks of most of the pictures that come in to *QST* one might think that it is a difficult thing to get good pictures of radio apparatus. On the contrary very excellent pictures can be taken with the simplest of cameras if sufficient care is taken. There are a few fundamental rules that, if followed, will invariably produce a sharp, deep picture with good contrasts—admirably suited for half-tone reproduction.

Here they are:

1. Use a *very small* lens aperture never over U.S. 32 (f22) and better U.S. 64 (f32). This is the most important rule of all and if not followed one may as well give up hope of the picture being any good. This means a long exposure—but most radio apparatus will sit still if left alone so there is no objection to making a half-hour or hour exposure. A simple lens is just as good for this purpose as a rectilinear or an anastigmat—so don't worry if your lens didn't cost a lot of money. If the picture will not come out with normal development or the negative is "thin" take the picture again and make the exposure lots longer. Don't try to "force out" a thin negative by over development—it always results in a muddy picture.

2. The best place to take the picture is in a room where there is good light from one or more windows but little or no direct sunlight. Place the apparatus on the side of the room opposite the windows with the back of the camera toward the windows. Such pictures can be taken out of doors if the day is cloudy but *direct sunlight is useless.*

3. Prints should be made on glossy surface paper. Matt surface is very poor for this purpose.

4. The larger the picture the better but

TAKE A LONG TIME

a small sharp picture is much better than a large "fuzzy" one. However the size must be governed by the subject to be taken. For instance; 3¼ by 4¼ may be large enough for a single piece of apparatus but for a group of apparatus 4 by 5 is about the smallest that can be used.

5. If you get a professional photographer to take the picture for you *keep clear of portrait photographers* if possible. Get a man who calls himself a "Commercial Photographer" and is used to taking pictures of machinery, etc. Portrait photographers always take "fuzzy" pictures. If you can't get any other kind though get a portrait photographer and sit on his neck till he agrees to use an aperture not larger than U.S. 32 (f32). Remember that what is wanted is a picture just as cold, hard and sharp as possible. The half-tone will always be much softer than the picture so unless the picture is very sharp to start with all the detail will be lost in the half-tone. If a commercial photographer does the job, call to his attention the possibility of making a better picture by using a panchromatic plate. Not all photographers have facilities for handling panchromatic plates.

—*F. C. B.*

Somebody says that loose connections or badly soldered joints cause most of the noise in a receiver. We know now that this chap has never been on the Gulf Coast or in the southern part of the Mississippi valley in the Summer time.

Experimenters Section Report

THE report on the eclipse tests is given completely in an article entitled "The Eclipse Tests" and appearing in this issue.

24 Hour Tests From 1XAM

Station 1XAM will run special transmission tests at 20 meters on Saturday, April 18, and Saturday, April 25th. These tests will start at Noon (Eastern Standard Time) and will continue without interruption for 12 hours. During this time the sending will be mainly by omnigraph, but hand sending will be used at intervals to announce whether the test will stop at midnight or continue right on through the 24 hours until Sunday noon.

It is not necessary to listen during all this time. Listen when you can, but try especially to make a *very careful* record of the time (use your local time so as not to become confused) and also put down very carefully the fashion in which the signals change—if they do.

FOR HEAVEN'S SAKE DATE YOUR RECORDS—leaving off the date spoils more amateur work than any one other thing.

Please do NOT send your records to ANY address except the following:

American Radio Relay League, 1045 Main Street, Attention Experimenters Section, Hartford, Connecticut.

1XAM will use the same set which is being copied from California to Paris in Daylight, therefore the signal strength will be ample.

New 5-Meter Tests

The new series of 5-Meter tests will be postponed another month. This is to give all hands an opportunity to utilize the 20-meter tests.

Static Elimination—Problem G-4

With the coming of the McCaa anti-static devices we can expect some action on the long-dead problem of anti-static work.

Double-Wave Interference—Problem R9

Excellent work has been done by Mr. William Shick of station 2MU in locating the causes of harmonic interference between senders and receivers not in the same wave-band. Unfortunately Mr. Shick has been greatly handicapped by inability to obtain an experimental transmission license. This would perhaps not be such an inconvenience were he not (unlike some others) equipped with a desire to adhere strictly to the limitations of his license at 2MU. All information on this general subject will be heartily welcomed by Mr. Shick, whose address is in the callbook.

Dead Spots

Again we wish to ask that all information on dead spots on ANY wave be sent to this section. We will in the end have enough of a file so that it is possible to tell something from it—but a *much* better response is needed.

Short-Wave R.F. Amplifiers—Problem R5

Please read with special care the forthcoming article on the Browning-Drake receiver. This article will appear in this or the next issue. Mr. Browning expresses it as his opinion that the device will work well as far down as 5 meters. It is, of course, merely an improved one-stage neutrodyne.

Coil Harmonics—Important

The recent article on the coil-harmonic method of calibrating wavemeters (p. 28 of March issue) seems to be open to question. The coil harmonics are not always spaced as they should be. Since the method is so very useful we would greatly appreciate it if someone will make a series of different coils and find out with what kind the "harmonics" are *really* odd and even harmonics.

Weather and Radio—Problem G3

More reports on weather, moon, and barometer effects are wanted.

The Serious Interference Problem

In view of the letter from the Department of Commerce it is urgent that the transmitting members of the Experimenters Section do some immediate work on problems A-7, R-9, T-1, T-6, T-8 and T-11. Some of these problems are going on well, but others are being neglected by the men who enrolled for them. These men can do both the broadcast-receiving amateur and the short-wave-transmitting amateur a real service if they will get at these things promptly.

An Explanation—Problem T-12

Many of the members have written us asking why problem T-12 has suddenly stopped. The explanation is that this problem is being managed by Mr. H. J. Tyzzer of the American Radio & Research Corporation, who has lately been snowed under with work. He may be addressed at that firm, and will, we hope, shortly be able to resume work on the problem.

Notice

Beginning next month one problem will be outlined in each of these reports.

Information on enrollments cannot be printed this month because space is limited. It may be found in back issues.

Cheap Insulators

THE wail that "I can't get any good transmitting insulators" has been heard often enough. We hope that this will make it useless.

Many towns have five-and-ten-cent-stores of the conventional red front type, and many others have stores which carry a cheap line of glassware. In these can be found low priced vases with thick walls that make "darned" good insulators. An illustration is given herewith of several such pieces of glassware seen in Hartford "dime" stores, with the prices attached as we noted them. Though the prices may vary throughout the country, still they will be as cheap or cheaper than the commercial type of insulator, and may eliminate the necessity of waiting on the U.S. Mail service. The mode of using these is illustrated in Fig. 2.

FIG. 1

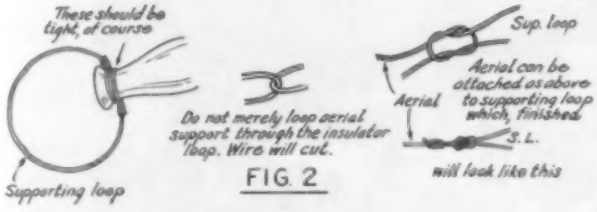

These should be light, of course
Supporting loop
Do not merely loop aerial support through the insulator loop. Wire will cut.
Sup. loop
Aerial can be attached as above to supporting loop which, finished
Aerial
S. L.
will look like this

FIG. 2

Finally you will notice in Fig. 3 two humble utensils that would make good insulators for a transmitting aerial without any cost being attached.

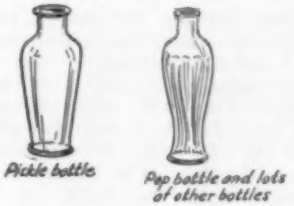


FIG. 3

6AWT has worked Australians 2BK, 3BD, and 2YI. 2AXF has worked WJS the station of the Rice Expedition in Brazil. 3AB has worked Belgian P2, and W2 has been heard. 2BY has worked EAR2 of Spain.

"John, quit shaking the money-box, Aberdeen is calling."—"*Amateur Wireless*," London.

The "Journal Des 8" published by M. Veuclin at Rugles, Eure, France, may be of interest to U.S. amateurs because of its long lists of calls heard. The subscription rate is 25 fr. per year to French amateurs and 35 francs per year to others.

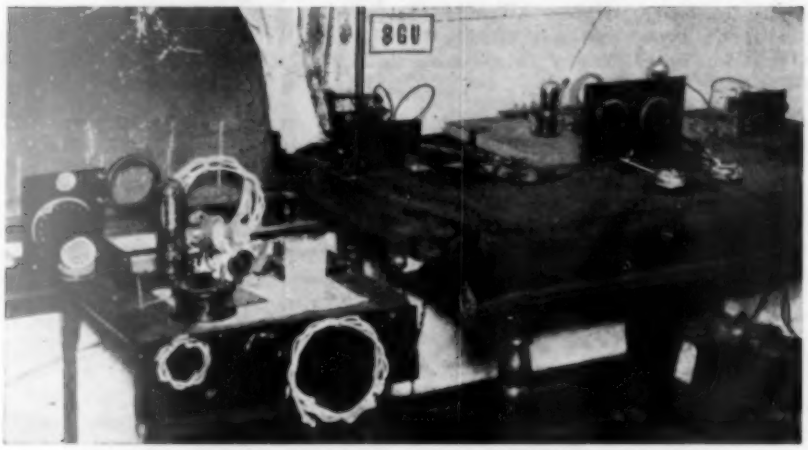
A Description of the Jenkins System for the Transmission of Pictures by Amateur Radio

It will be in the

MAY ISSUE OF QST

Amateur Radio Stations

8XC-8GU, Erie, Penn.



F. Dawson Bliley, 8XC-8GU, is a confirmed experimenter; therefore one never finds his station as it was.

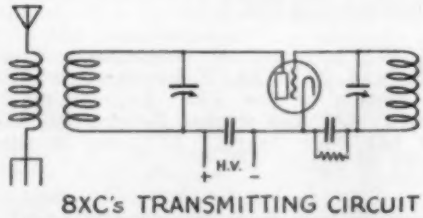
The transmitting circuit is of the tuned plate-grid variety and used on waves between 8 and 110 meters. The circuit is shown in the diagram. It works satisfactorily on all harmonics of the antenna tune up through the fifth. With the antenna meter at the current antinode, the antenna current is usually the same for any of the harmonics, or about one ampere. Of course the position of the meter in the circuit will determine its reading. The fifty-watt tube used has its base removed and is sitting on a piece of insulation. A water grid-leak is used. A power transformer delivering up to 3000 volts to a chemical rectifier provides the plate supply. This transmitter is at the left of the photograph.

The small set in the center of the photograph is a portable 5-meter transmitter which generally uses the call 8QJ.

The receiver is in the center of the table. It uses a six to eight-foot length of wire as an antenna connected directly to the grid side of the secondary. The receiving circuit is the usual tickler arrangement. This small antenna has a capacity relation to his usual one that provides the equivalent of a small series antenna condenser. The system works very satisfactorlly as 8XC hears the foreign amateurs as well as the rest of us.

To the extreme left is a wavemeter which was harmonic calibrated from WWV's standard wave broadcasts.

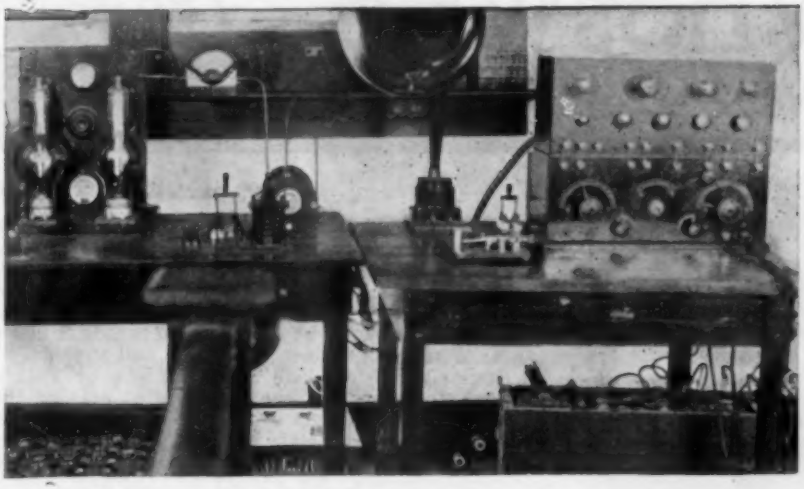
The antenna and counterpoise are each two wires fanned out to six feet of separation and eighty feet long. The antenna and counterpoise are about twenty feet apart. Glass insulation is used throughout.



8XC's TRANSMITTING CIRCUIT

In experiments, bad interference was noticed on the 20 and 40 meter bands. The lights in the house were found to be to blame so several 10-microfarad condensers were made and inserted at the light that bothered and grounded. The trouble was then shifted out of the way to a higher wave. Most automobiles are heard passing when receiving from 10 to 20 meter stations.

4BY, Savannah, Georgia



4BY is owned by J. E. Hodge of the Hodge Optical Co. of Savannah, Ga. The station has been heard in a number of foreign countries and has communicated with Europe many times.

The receiver in the photograph is a Zenith three-circuit short wave receiver that has reformed into a Weagant because of the ease of tuning the latter. No other advantage was found in the Weagant circuit. A low-loss set has been tried that apparently gives no better results after considerable experimentation.

The transmitter is of the inductively coupled Hartley variety using a couple of 250-watt tubes. A 200-jar rectifier has been used but experience has caused its abandonment. The rectifier usually rotted out about every six months and needed rebuilding, which was both an expensive and cumbersome process. Plate voltages up to 6000 are obtainable from a homemade power transformer.

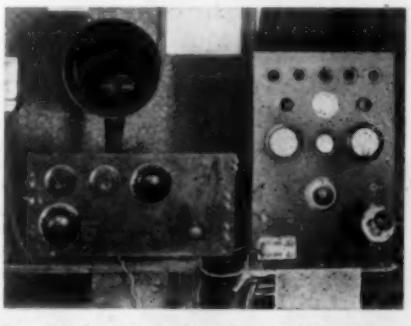
The antenna system is supported by a cypress pole set in concrete. This pole has on top of it a steel extension of 26 feet which totals a height of 93 feet. The 75-80 meter antenna is a cage about 75 feet long practically vertical. The counterpoise is a similar cage. For the 39-43 meter band a thirty-foot single wire is used for the antenna with a duplicate counterpoise.

9AV, Union City, Indiana

9AV is owned and operated by Ralph B. Weiss. Weiss is a W.U. man and uses the personal sine "W" on both wire and air. He is sometimes casual in the assortment of dots and dashes he uses so remember it's "morse" if you can't read it.

The set in the center is a low-loss receiver of the usual sort with sufficient holes in the panel to allow the mounting of any sort of apparatus for experiments. The transmitter is to the right and is arranged to use up to five 5-watters. Phone is used occasionally for local work and has been heard up to 500 miles on the usual power employed; a couple of W.E. 5-watt tubes. 310 volts D.C. is used as the plate supply.

The antenna and counterpoise seldom remain the same way long as these are being experimented with. The system at the time of the photograph was a single ribbon 150 feet long for the counterpoise, a similar



ribbon 75 feet long for the aerial. The ribbon is enameled by 9AV himself to prevent corrosion.

Who's Who in AMATEUR WIRELESS

GEORGE H. PINNEY, 1CKP

Mr. Pinney is another excellent example of what is becoming of some of the BCL'S. In '21 he became interested in Radio because of the concerts but, he says, he wasn't satisfied with that, so later in the same year he installed a transmitter using two 5-watt tubes. The power at present at 1CKP, however, is 2 250-watters. Mr. Pinney is a sincere member and supporter of New England division. He is a graduate of Yale and the Sheffield Scientific School. He is at present the treasurer of the Williams Brothers Manufacturing Company, which is a silver plate concern, and the Glazer Manufacturing Company, woolen manufacture, among his other interests. Mr. Pinney was the first New England Division Director of the A.R.R.L.

F. B. WESTERVELT, 8VE-8ZAH "WX" OF 8XD

Frederick B. Westervelt began his radio experience back in 1912. His pre-war station had the call of 8ATD, which he says did not accomplish much. After the war, he obtained his present call of 8VE. In 1922 he combined with Parker E. Wiggin to make the well-known station 8ZD, which partnership has had to be broken up since, because of Mr. Wiggin's moving to Wilkinsburg, Pa.; so 8VE-8ZAH is a one-man station with a 250-watt bottle. "WX" distinguished himself in P.R.R. emergency service by organizing ability of the highest order. "WX" is at present a senior at the University of Pittsburgh.

ELLIOTT WHITE, "EW" OF 1YB

Elliott White, "EW" or "Doc" at 1YB-1XAV-WFBK-1BMK, is the Technical Adviser, Dartmouth Radio Association and English-Professor at Dartmouth and the newly elected Director of the New England Division. He is author, too, of various radio articles. Mr. White's interest in radio began in 1900 when he built a copy of Marconi's original set. He has since built and operated 9YS, 8QY, started radio clubs at Univ. of Miss. and Univ. of Mich, and designed the present station at Dartmouth. Mr. White has been an Infantry Signal Sergeant on the Mexican Border, and has done radio work for the War Department. "Doc's" mottoes are: "The foot that rocks the cradle, pounds the key", and "Every amateur his own radio engineer."

Our I.A.R.U. Representative

The Canadian General Manager recently attended the Board Meeting of the A.R.R.L. where it was decided that Canada should have individual representation at the I.A.R.U. conference in Paris in April of this year. In accordance with this idea, letters soliciting subscriptions for financial aid in sending our representative have been sent out by the C.G.M. to all A.R.R.L. members in Canada. It is hoped that a hearty response will be had from the membership to enable us to supply our representative, who will be Major Wm. Coates Borrett, Manager of the Maritime Division.

Contributions Wanted

In connection with the Canadian Section of *QST*, the Canadian General Manager would like to point out that the response from the membership will have to be more widespread if this is to be a success. At the present time the arrangement is that the Division Managers are responsible for the collection of material in their divisions. Obviously the Division Managers cannot write this material themselves, and we hereby appeal to the membership at large to let their Division Managers have articles on any radio topic which is new, so that the Division Managers will not be entirely overburdened with the labour of collecting this material. This section is still on trial and we wish to state frankly that if the membership does not support it by assisting the Division Managers, it will be abandoned. It is up to the membership at large and something more than talk is required if the section is to be maintained.

Eclipse at Long's Corners, Ontario

By Canadian 3AF and 3AFP, Ottawa

3AF and 3AFP journeyed from Ottawa to Long's Corners, (near Hamilton) where a temporary observatory had been erected by Dr. Chant of Toronto University, in the center of the path of totality. Their object was to obtain the correct time for recording the contacts of the eclipse, and to observe any effects the eclipse had on radio reception.

WHEN we arrived at Hamilton on the Wednesday morning before the eclipse, the first problem was to get ourselves and equipment out to Long's Corners. Unfortunately nobody seemed to have heard of this corner, but all assured us that the roads would be snowed in. Finally we loaded on a truck and got started—up to the top of the mountain (the residents of this locality are very proud of their mountain) and then up-hill for 7 long miles more. We found that our comfortable and enjoyable ride had been due to solid tires on the wheels of the truck.

No wonder the Hamiltonians did no know of this place—a small store, a garage, and a tumbledown shed denoted the end of our travels. The observatory was located in the centre of a field nearby, and was a shack about 15 by 12 feet, with a 45 foot camera extending from one end.

After getting acquainted with the inhabitants of Long's Corners, we examined the observatory and appropriated a corner in which to set up the long-wave receiver (15,000—20,000 meters) the three chronometers, chronograph, relays, etc. This equipment was used for obtaining a comparison between the time signals transmitted from NSS Annapolis and our chronometers. On the morning of the eclipse NSS had arranged to send special time signals, and the difference in time of these signals and our chronometers would be re-

corded to within 1-100th of a second. Similar comparisons would be made at the Dominion Observatory, Ottawa, with their standard clock; thus on our return the times of contact recorded on the chronograph could be translated into readings of the standard clock at Ottawa.

Two aerials were put up without mishap other than getting mixed up with a few snow drifts, and although the wire was somewhat difficult to handle in the cool breezes that swept across the hills, it finally went into subjection. Some more wire was buried in the snow for a counterpoise system.

After this effort we had time to look around and found that the camp had grown: Two more Ottawans had arrived and pitched three tents for use as a magnetic observatory. They had a copper stove in one of the tents, a very welcome addition of which we proceeded to make good use. Unfortunately somebody had fired up with green wood, the moisture from which condensed in the copper stove pipes, trickled down through the joints, and boiled on the top of the stove. Preferring to freeze rather than to suffocate we departed, finishing up the afternoon by running a line over to the tents for supplying time signals for the magnetic observations.

Around the box stove in the dingy garage that evening we tried out the broadcast and short-wave receivers. Whatever else we may have thought of Long's Corners, it certainly seemed an ideal spot for reception. A number of amateurs were coming in on two tubes without aerial or ground, and with the help of the telephone lines as an aerial all U.S. districts except the 7th were copied. Broadcast reception was fairly good, nearby and distant stations being received. But while all was well on the radio, a gale was blowing outside, and the road beak to Hamilton was drifting in. After taking time signals and rating the chronometers at 10 p.m., we found that the magnetic observers had made up beds and decided to sleep in their tents (the fog in the tents had subsided somewhat by this time). Reluctantly we had to give up hopes of getting back to a hotel in Hamilton, as no car could have got through the drifts. Somebody suggested walking, but this did not meet with general approval, so 3AF picked out the best-looking car in the garage and went to sleep in the back seat. While 3AFP fed chunks of old auto tires to the helpless stove. However in the early hours of the morning the owner of the garage arrived from Hamilton, after walking the last two miles through the drifts, and, taking pity on two poor stranded amateurs, gave us the best room in his house for the night.

The next two days were spent in checking up reception, rating chronometers, and interviewing reporters, who somehow made the grade from Hamilton in spite of impassable snow drifts. Short-wave reception was remarkably good, and 80-meter signals came pounding in at all times of the day and night; in fact, night signals seemed but slightly stronger than those heard in the afternoon. As the temperature dropped well below zero at night and no heat was provided in the observatory, the pleasure of staying out and logging foreign amateurs was foregone.

By Friday afternoon the road had been dug out, four telegraph lines had been installed for the newspapers, and visitors began to appear. Three movie cameras were on the scene, and numerous press photographers. Two more observation parties located on the field, one equipped for measuring the light intensity and the other the shadow bands. Arrangements were made for relaying the time to these parties.

On the morning of the eclipse, the first arrival on the scene was a big touring car with its top turned up vertically behind so

as to permit free access of radio waves from the heavens above. Inside were a couple of experts, each with a ten-tube supermahogany and a solid walnut loop. After they settled down to business we asked how their broadcasting station was coming in (it was only a little over an hour's drive distant). No, they were just trying to tune up the other set. In the whole time they did not give us an opportunity to even hear a whisper out of that grand array of soldiers (ten deep) to be seen under the delicately carved lids. They said they had trouble with the telegraph circuits, and they fled up the road, but the devil followed faster. They tuned up code wherever they went; no, they didn't tune it, it just came in. And they didn't even get a view of the eclipse, as heavy clouds spoiled the whole show.

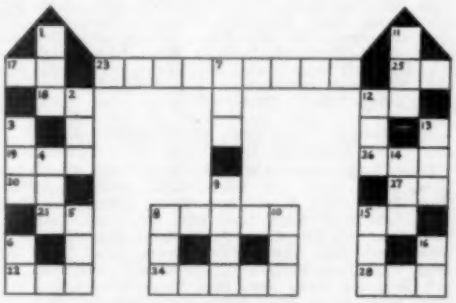
But about reception conditions at the observatory: There remained no doubt in our minds that it was a poor morning on the short waves. Hardly a signal could be coaxed in through the bad QSS. 2GK, Schenectady, was heard sending ARRL test program about ten minutes before totality, but faded out. 1BHM, New Haven, Conn., was copied at 9:05 and held through totality for about 4 minutes, but QSS was bad and strength of signals varied continually. From 9:10 until 9:30 conditions remained about the same; very few calls could be obtained on account of weak signals and fading. As far as could be judged the eclipse had no marked effect on 80-meter signals—the small changes in signal strength noted were, we think, due to the bad receiving conditions and fading. Two interesting points were noted: c9AL was putting 400 watts out on 85.6 meters, just 40 miles away from our location, but not a trace could be heard of him, although we put forth our best efforts on 85.6. A strong harmonic of CFCA, Toronto, was heard on about 88 meters at 8:00. After taking time signals at 8:40, this harmonic had disappeared and was not heard again.

Normal or good reception was had on the concert wavelengths, that is, signals came in before and after the eclipse only as would be expected in daylight, but during and just after totality conditions approached those of night. Many stations were available, including CNRO Ottawa (230 miles), and best reception was noted about 10 minutes after totality. This might be explained by the later time of darkness to the east of us and over transmitting stations. Nearby stations that were heard strongly in daylight were neglected in drawing conclusions.

On the long wavelength, 17,000 meters, no unusual conditions were noted, although time did not permit us to listen on these wavelengths for long.

While we were engaged in packing up the instruments, some kind soul went to the trouble of taking down our aerials. We appeared on the scene just in time to claim the wire; and thus relieved of our last worry we bade Long's Corners au revoir until the next eclipse, and got out just before the roads blew in again.

THE puzzle below was sent to us as a brainchild of the Lansdowne, (Pa.,) Radio Assn. by their board of directors, who have also arranged with us to send one large A.R.R.L. wall emblem as a prize for the first person solving the puzzle correctly. The solutions sent in must be dated because the date thereon will be the determining factor in deciding who first solved the problem. The correct solution will be printed in the next issue of *QST*.



Vertical

1. How a ham feels when he blows a tube.
2. What hams do at a banquet.
3. What 500-cycles on the plate make.
4. Instrument to use on a tree in the way of a perfectly good counterpoise.
5. Some.
6. Man called in the day after convention banquet.
7. Prominent association in Lansdowne, Pa. (abv.)
8. Well-known author of QST stories.
9. Brass-pounders.
10. What you get in the ear when somebody opens up in the next block.
11. Noisy as hell.
12. How an amateur feels when his wife makes him give up radio.
13. New York's QRM factory.
14. What kind of an ARRL certificate do you want for your junkpile?
15. The summer demon.
16. How a ham laughs.

Horizontal

8. Familiar syllable before "cons".
12. What you say to others in the shack when copying DX.
15. Quite so. (abv.)
17. Word that always goes ahead of "OM".
18. From.
19. The Old Man's cuspidor.
20. Weather.
21. And.
22. What a ham says when his 50-watter goes west.
23. Some tubes do and some tubes don't.
24. What B.C. stations put out.
25. Wait a minute.
26. First name of WNP's op.
27. First two initials of 3d District Supervisor.
28. Philadelphia's joy.

Calls Heard

R. L. Royle, G2WJ,
"Southwold," Aldermans Hill, Palmers Green, London, N13, England

1aac, 1aao, 1ac, 1af, 1aid, 1ajx, 1all, 1alk, 1amf, 1ary, 1atj, 1auc, 1axz, 1bal, 1bbe, 1bcr, 1bdx, 1bep, 1bes, 1bgo, 1bgq, 1bhm, 1bw, 1cab, 1cak, 1cav, 1ci, 1ckp, 1ckq, 1cme, 1cmp, 1cr, 1da, 1dl, 1gs, 1kc, 1kx, 1lw, 1ok, 1ow, 1pl, 1py, 1sf, 1sw, 1xm, 1xu, 1xz, 1yb, 2abd, 2ag, 2agb, 2anm, 2avu, 2bgg, 2bgq, 2blm, 2bm, 2bqu, 2bqw, 2bsc, 2by, 2byg, 2cbg, 2ccj, 2cee, 2cei, 2cjb, 2cjx, 2cls, 2cre, 2cty, 2cvf, 2cvj, 2cyw, 2dn, 2fk, 2gk, 2je, 2ke, 2mc, 2mg, 2mu, 2oq, 2tb, 2rk, 2ub, 2wr, 2xab, 2zb, 3ab, 3adp, 3adq, 3ajd, 3bco, 3bjp, 3bta, 3cbl, 3chc, 3chg, 3cpj, 3hs, 3ig, 3mf, 3oq, 3qr, 3wb, 3xl, 3yo, 4du, 4gw, 4io, 4jr, 4aa, 4tj, 4tw, 4xe, 5rl, 5za, 8amr, 8avd, 8bmf, 8bnf, 8bnh, 8bpa, 8cnw, 8cuk, 8ef, 8rg, 8tr, 8uf, 9aaw, 9abf, 9bcj, 9cjc, 9dgu, 9eld, 9xw, nkf, nfv, wjs. Canadian: 1ar, 1dd, 1dq, 2bn, 3bp. Australian: *3bq*. Mosul: HH.I.

Alfred D. Gay, 6NF, 49 Thornlaw, Road, West Norwood, London, S. E., 27, Eng.

1aap, 1atj, 1aar, 1ajx, 1all, 1auc, 1aao, 1acb, 1aid, 1avx, 1axn, 1apf, 1af, 1bhw, 1bpb, 1bsd, 1ban, 1blx, 1bep, 1bqs, 1bdh, 1bes, 1bcr, 1bwx, 1bbx, 1bco, 1cqs, 1cav, 1ci, 1cab, 1cru, 1cri, 1cx, 1gs, 1my, 1ml, 1nd, 1nu, 1py, 1st, 1zs, 2aar, 2agb, 2abt, 2ag, 2bqu, 2bw, 2brb, 2bgi, 2by, 2bum, 2bre, 2cxw, 2cla, 2cxr, 2cft, 2cep, 2cub, 2cei, 2cvf, 2cjx, 2cxm, 2cjb, 2dm, 2eb, 2kg, 2kf, 2kx, 2le, 2wb, 2wr, 3ab, 3auv, 3alx, 3adv, 3adq, 3bta, 3bva, 3bnu, 3cbl, 3chc, 3chg, 3cc, 3cf, 3dh, 3ou, 3oq, 3qs, 3rr, 3sg, 3sf, 3te, 4do, 4eq, 4fs, 4kl, 4uk, 5hl, 5ad, 8abn, 8adg, 8ad, 8ada, 8bem, 8bbw, 8bkh, 8bcp, 8cbp, 8ccq, 8ced, 8cmt, 8fh, 8gs, 8dnf, 8ddo, 8nb, 8tr, 8uf, 8uq, 8xb, 9bcj, 9erd, 9bht, 9coc, 9dun, 9dwx, 9ehy, 9vc. Canadian: 1af, 2cg, 2be.

G6NH, J. W. Davies, Doddington, Caterham Valley, Surrey, England.

1aa, 1aak, 1aao, 1af, 1ajx, 1atj, 1auc, 1ban, 1blu, 1cak, 1cme, 1gs, 1pl, 1se, 1wl, 1xm, 1xz, 1zt, 2ag, 2agu, 2blm, 2bum, 2bw, 2by, 2cqs, 2cxw, 2gk, 2kx, 2tp, 3ab, 3ap, 3bo, 3bwt, 3cjn, 3lw, 3mf, *3ot*, 3oq, 3rb, 4fz, 4gw, 4ku, 4sa, 4tv, 4tw, 5ail, 8adg, 8aol, 8er, 8gx, 8nb, 8pk, 9axx. Can.:1ar, 1dd, 1dq. Pse.: QSL. All crds answered.

H. E. Nicholson, G6VP,
42 Southsea Ave., Watford, England

1aao, 1af, 1ajp, 1all, 1avf, 1aww, 1bdh, 1bes, 1bgq, 1bhm, 1bkq, 1boa, 1bpb, 1chc, 1gs, 1kc, 1pl, 1rd, 1wy, 1xz, 1yb, 2ag, 2axy, 2bgi, 2bqc, 2brb, 2bsc, 2bw, 2bwj, 2cei, 2cvj, 2dd, 2eb, 2wr, 2wy, *3ab*, 3bco, 3bnc, 3bp, 3chg, 3chj, 3cuj, 3hh, 3mf, 3ot, 4fz, 4IO, 4jr, 4tj, 5cc, 5se, 8acy, 8adg, 8nb, 8xe, 9dmj, 9vc.

g6HR, W. D. Keiller, 51 Highworth Road, New Southgate, London, N.11, Eng.

1aac, 1aca, 1agj, 1aid, 1alk, 1ana, 1apk, 1aqm, 1ary, 1atj, 1axz, 1bdt, 1bdx, 1bep, 1bgq, 1bjo, 1bri, 1bvl, 1cme, 1cmp, 1cpk, 1cre, 1da, 1ef, 1er, 1fl, 1ktu, 1lw, 1pl, 1qx, 1sf, 1sw, 1xak, 1xam, 1xz, 2aco, 2adm, 2ag, 2ago, 2axf, 2bgo, 2bqu, 2bre, 2by, 2cee, 2cei, 2cqu, 2cul, 2eq, 2mu, 2sw, 2tp, 2ud, 2xq, 3adb, 3ajd, 3bta, 3chc, 3hh, 3oma, 3vw, 3yo, 4cb, 4io, 4jr, 4ku, 4xe, 5ml, 8adg, 8gs, 8pl, 8tr, 8xav. Canadians: 1ar, 2ax, 2az.

g6NH, J. W. Davies, Doddington, Caterham Valley, Surrey, England.

1abs, 1ana, 1are, 1ary, 1aww, 1bdt, 1bdx, 1bes, 1bhm, 1brb, 1bvb, 1bst, 1cab, 1cb, 1ck, 1ckg, 1cmp, 1kc, 1qb, 1xav, 1xm, 1yb, 1zt, 2agw, 2bc, 2bg, 2bm, 2bq, 2bsc, 2bgg, 2by, 2byw, 2cbg, 2chs, 2cvj, 2dm, 2dn, 2eb, 2nnk, 2pe, 2ud, 3ajd, 3bss, 3bta, 3btr, 3chg, 3dg, 3hg, 3hs, 3ig, 3ot, 3uw, 3yo, 4io, 4tj, 5aid, 5ea, 5uk, 8amr, 8tr, 8vq, 9eld. Canadian: 1ar, 1bn, 1bq, 1dq. Australian: 2ds, 3bq.

8DE, Edouard Le Blanc,
87 Rue Reynard, Marseilles, France.

1af, 1ajx, 1all, 1atj, 1auc, 1axz, 1ban, 1bcr, 1bdx, 1bes, 1bhm, 1bkq, 1bsd, 1gs, 1ma, 1pl, 1rd, 1wl, 2abt, 2ag, 2axy, 2bm, 2bq, 2br, 2by, 2ce, 2cxw, 2gs, 2mc, 3che, 3chg, 3mf, 4cc, 4jr, 8ame, 8fk, 8vq, 9cjc, nfv, nkf. Canadians: 1ar, 2au, 2bg.

F8DD, J. F. Bastide, 14 Place St., Sernin, Toulouse, France.

1ajx, 1aw, 1bcr, 1bgq, 1cer, 1af, 1fm, 1sw, 1bhm, 1yk, 1sy, 1zs, 1ok, 1yd, 1aid, 1ary, 1axg, 1bal, 1bdp, 1bvl, 1bwj, 1ckp, 1ti, 1my, 1gso, 1wd, 1as, 1pl, 1py, 1sf, 1zs, 1avj, 1bdh, 1bdx, 1blh, 1cx, 1mx, 1qv, 1wl, 1aae, 1avf, 1aww, 1axz, 1alk, 1bcr, 1bec, 1bep, 1bg, 1bgd, 1bie, 1blu, 1bqi, 1bum, 1buy, 1cak, 1ceg, 1ccx, 1ckq, 1bkq, 1dq, 1ga, 1gh, 1gs, 1hn, 1kc, 1ky, 1peu, 1rd, 1aqc, 1sz, 1wi, 1xav, 1xz, 1yb, 1yz, 2ago, 2brc, 2cla, 2wb, 2ay, 2ayx, 2by, 2cuj, 2bjp, 2bv, 2chg, 2cjb, 2fe, 2abt, 2adj, 2blm, 2br, 2cei, 2mu, 2mw, 2cyq, 2nu, 2ag, 2bqu, 2cvj, 2eq, 2aly, 2aqh, 2au, 2bgg, 2bqb, 2bqc, 2brb, 2bum, 2buy, 2cep, 2cpk, 2epo, 2cqo, 2cqs, 2crq, 2ctq, 2cty, 2dd, 2hx, 2ke, 2rc, 2zb, 3ab, 3chg, 3af, 3cbj, 3ghg, 3hh, 3xx, 3bjp, 3ca, 3chg, 3wb, 3bq, 3adq, 3ckl, 3mf, 3aih, 3baq, 3bea, 3bhv, 3blp, 3bob, 3bqb, 3btq, 3bur, 3bwj, 3bwt, 3hs, 3in, 3ju, 3lr, 4jk, 4ku, 4eh, 4eq, 4ft, 4tv, 4uk, 4xk, 4oa, 4by, 4xg, 4aa, 4jr, 4bl, 4gw, 4hw, 4qf, 4sb, 4tw, 4uq, 5al, 5ail, 5cvo, 5jx, 5aot, 5asz, 5av, 5bg, 5ck, 5dw, 5ew 5lh, 5nj, 5ov, 5ox, 5qy, 5rv, 5uk, 5xa, 6xma, 6qar, 8ago, 8dal, 8tx, 8xko, 8bbw, 8bz, 8gx, 8bhw, 8ced, 8ry, 8uf, 8adg, 8aox, 8tp, 8ay, 8bk, 8bpa, 8buk, 8byh, 8col, 8cuh, 8dgp, 8dme, 8dn, 8dse, 8es, 8kc, 8pk, 8pl, 8up, 8uq, 9bjl, 9bca, 9bht, 9bhy, 9bhx, 9bna 9cap, 9cbz, 9cej, 9chg, 9eas, 9hw.

Radio Club de Reims, f8CS,
Reims, France.

1abf, 1abs, 1abt, 1abw, 1agh, 1aid, 1aja, 1ajg, 1ajp, 1ajt, 1alk, 1ana, 1apu, 1aqm, 1are, 1ary, 1asl, 1aww, 1bal, 1bdi, 1bdt, 1bdx, 1bep, 1bgq, 1bhm, 1bhw, 1bht, 1bis, 1bkz, 1bsd, 1bvl, 1bzu, 1buh, 1cab, 1cak, 1cc, 1ck, 1cme, 1cmp, 1crw, 1da, 1dd, 1fd, 1gv, 1hn, 1iv, 1kc, 1lw, 1my, 1ow, 1pl, 1sw, 1vj, 1xm, 1xw, 1yb, 1zt, 2ad, 2adj, 2ag, 2agb, 2agw, 2ana, 2awf, 2bbn, 2bg, 2bm, 2bmr, 2bn, 2bo, 2brb, 2br, 2bre, 2bsc, 2by, 2byw, 2cbs, 2cee, 2cei, 2chk, 2cpk, 2cqz, 2cvs, 2cvu, 2eb, 2eq, 2kf, 2mu, 2qh, 2tp, 2ud, 2xq, 3ab, 3adp, 3adq, 3ajd, 3alx, 3apu, 3auv, 3beo, 3bdo, 3bfe, 3bgf, 3bg, 3bof, 3bos, 3bss, 3bp, 3bwj, 3bwt, 3cbl, 3cdg, 3chg, 3chg, 3ckl, 3cjn, 3hd, 3hg, 3hh, 3hs, 3hq, 3jh, 3ju, 3kd, 3ll, 3mf, 3ot, 3qv, 3vw, 3wb, 3xx, 4eh, 4eq, 4fg, 4fm, 4ft, 4fz, 4gw, 4io, 4ku, 4mb, 4oa, 4sa, 4tj, 4uk, 4xe, 5aaq, 5ac, 5ox, 5rh, 5uk, 5zas, 8aac, 8add, 8adg, 8ago, 8aly, 8amr, 8atp, 8avl, 8bgf, 8cav, 8cia, 8cko, 8eo, 8cyi, 8dgo, 8djg, 8dnf, 8doo, 8dtr, 8fk, 8gz, 8hn, 8jq, 8nb, 8pl, 8ry, 8up, 8vq, 8vt, 8xb, 8xav, 9bht, 9bwk, 9bwp, 9bpy, 9cns, 9dqu, 9efz, 9em, 9xw, 9zt. Canada: 1ar, 2az, 2bg, 2cg, 3bf, 3bp. New Zealand: 4aa, 4ag, 4ak.

f8SM, M. Sacazes, Service Radio,
Region Sud, Toulon (Var.), France.

1aae, 1ajp, 1akd, 1al, 1am, 1ana, 1aok, 1apy,

1ary, 1atj, 1auu, 1aww, 1axz, 1azq, 1bdh, 1bdt, 1bdx, 1bge, 1bgf, 1bhd, 1bhq, 1biq, 1boa, 1bsd, 1bxp, 1cab, 1cad, 1cat, 1cbg, 1cbx, 1ccg, 1ceg, 1cf, 1ci, 1cj, 1ck, 1cke, 1ckf, 1ckp, 1clj, 1cme, 1cmp, 1cpl, 1ew, 1fa, 1fg, 1gv, 1hm, 1ii, 1kd, 1kz, 1ll, 1lw, 1pc, 1pl, 1pm, 1py, 1re, 1se, 1sp, 1sw, 1ts, 1vs, 1wg, 1wl, 1xam, 1yb, 1yl, 1yx, 1yz, 2afp, 2agb, 2agw, 2aja, 2atf, 2avu, 2axn, 2bgg, 2bgi, 2bjw, 2bm, 2bmq, 2brb, 2brc, 2brr, 2by, 2byj, 2byw, 2cb, 2cbe, 2cbg, 2ccz, 2ce, 2cee, 2cel, 2cep, 2cjx, 2ck, 2ckg, 2cla, 2cm, 2cpp, 2cqo, 2ct, 2cww, 2cyw, 2dm, 2fof, 2gf, 2hg, 2if, 2ix, 2jl, 2kf, 2ku, 2kx, 2kz, 2ol, 2pi, 2qh, 2rg, 2rk, 2tz, 2ud, 2uk, 2wr, 2xq, 2yq, 3aam, 3ab, 3abw, 3ac, 3ajd, 3aud, 3ax, 3bhu, 3bhv, 3bot, 3bss, 3btz, 3btu, 3bva, 3bwa, 3cah, 3cbh, 3cbc, 3chg, 3cho, 3cjm, 3cjw, 3dhx, 3hg, 3hs, 3hsg, 3ig, 3mf, 3nk, 3se, 3sf, 3ag, 3xr, 3yo, 4cb, 4fo, 4fs, 4fz, 4gz, 4io, 4ku, 4me, 4mv, 4qz, 4sa, 4so, 4tj, 4ti, 4tz, 4uz, 4xe, 4yo, 4yx, 5cm, 5hl, 5lak, 5lu, 5nw, 5of, 6abq, 6ahp, 6alj. 6ame, 6ase, 6awt, 6cam, 6chl. 6cka, 6ru, 6ve, 6xg, 7bl, 7bn, 7se, 7ah, 7ug, 8aa 8abb, 8abg, 8add, 8adg, 8ajg, 8alg, 8any, 8arm, 8awc, 8bad, 8bbf, 8ckj, 8ese, 8cyi, 8fm, 8fn, 8hg, 8jq, 8lag, 8nb, 8np, 8rg, 8tr, 8uf, 9bhe, 9bht, 9bhy, 9clj, 9cu, 9dmj, 9dy, 9efz, 9eky.

Leon Deloy, f8AB, 55 Boulevard de Montboron, Nice, France.

1aac, 1ad, 1aek, 1alj, 1alk, 1apk, 1apu, 1are, 1atj, 1axj, 1bcu, 1bdh, 1bdx, 1bec, 1bes, 1bhw, 1bju, 1bpb, 1boa, 1bsd. 1bvb, 1cka, 1ckc, 1ckp, 1cme, 1cmp, 1cmy, 1se, 1sw, 1xs, 2ana, 2anm, 2awo, 2bm, 2bo, 2brb, 2brn, 2bsc, 2bss, 2byk, 2by, 2byw, 2bxw, 2sbg, 2cef, 2cei, 2cgi, 2chk, 2cpk, 2cpo, 2cvj, 2dd, 2kx, 2qh, 2us, 2ud, 2xq, 3adb, 3abw, 3ajd, 3bwt, 3hg, 3hh, 3ju, 3kd, 3lg, 3mb, 3mf, 3qt, 3uw, 3uv, 4bq, 4eq, 4io, 4jr, 4sa, 4tj, 4xe, 5ca, 8aco, 8ada, 8adg, 8ah, 8aly, *8avd*, 8bau, 8ck, 8dne, 8dhw, 8dme, 8dnf, 8gx, 8jm, 8rg, 8ry, 8tr, 8vq, 8xav, 8xk, 8yq, 8yv, 9bhx, 9mm. Canada: 1ar, 1bq, 2bn, 2cg, 9al.

M. Sacazes Marcel, f8SM, Service Radio, Toulon, France.

1ajb, 1akd, 1ana, 1aok, 1ary, 1atu, 1aww, 1bdx, 1bge, 1bgf, 1bhm, 1bsd, 1ceg, 1cf, 1ck, 1cj, 1cmp, 1fg, 1hm, 1ii, 1kd, 1kcx, 1ll, 1mof, 1pm, 1se, 1sw, 1yb, 1yx, 1xam, 2agw, 2bjw, 2bmq, 2brb, 2bre, 2brr, 2by, 2byj, 2cbg, 2ccz, 2cep, 2ckg, 2cla, 2cm, 2ct, 2cvj, 2gf, 2hg, 2if, 2ix, 2jl, 2kf, 2ku, 2kz, 2ol, 2qh, 2rk, 2tz, 2ud, 2xq, 3aal, 3ag, 3ajd, 3aud, 3bot 3bss, 3bwa, 3cah, 3cjm, 3dby, 3ig, 3mf, 3nk 3sf, 3ag, 4io, 4fz, 4me, 4mv, 4tl, 4tj, 6qwt, 6djj, 7abl, 7bl, 8aa, 8ajg, 8cse, 8cyl, 8hg, 8jur, 8nb, 8wal. Canada: 1ar, 1dd, 2az, 3wx.

G. Perroux, f8BV, 96 Boulevard, Montparnesse, Paris.

1aaj, 1ahl, 1aja, 1ajg, 1ana, 1anr, 1atj, 1aur, 1awe, 1aww, 1axa, 1boe, 1bv, 1bvl, 1ckp, 1coa, 1cmp, 1etb, 1da, 1dj, 1fd, 1fg, 1if, 1kac, 1kem, 1lw, 1pl, 1sf, 1sw, 1vj, 1wl, 1xaw, 1xe, 1xe, 1zab, 2ad, 2ag, 2bcr, 2bfr, 2bgg, 2bn, 2brb, 2bst, 2cbg, 2cda, 2cel, 2cvj, 2cvu, 2eq, 2kgg, 2mu, 2tp, 2wb, 3abq, 3bof, 3bmw, 3bss, 3bva, 3bva, 3cbs, 3chg, 3hg, 3hh, 3hj, 3jh, 3lr, 3oq, 3ot, 3nce, 3tf, 3tuw, 3wb, 3xh, 4av, 4ay, 4jr, 4ns. 4mi, 4sa, 4si, 4tj, 4uk, 5se, 5uk, 5vn, 6xa, 7afr, 7bg, 8alc, 8aly, 8bnh, 8brj, 8bga, 8cse, 8dic, 8dme, 8kz. 8lw, 8nay, 8ns, 8ol, 8pl, 8xtg, 9axx, 9ckw, 9clx, 9eno, 9cpi, 9dak, 9dlw. Canada: 1gu, 3ar. N. Z.: 4rw.

Belgian, 4RS.

1aa, 1aao, 1af, 1ajx, 1all, 1awe, 1axz, 1bes, 1bgq, 1bhm, 1bkq, 1bpb, 1cab, 1cbg, 1cme, 1cmp, 1gs, *1ke*, 1pl, 1xz, 1yb, 2aar, 2afp, 2ag, 2bcg, 2bgi, 2br, 2by, 2byk, 2cee, 2cgx, 2cjx, 2ckx, 2cqz, 2cxw, 2mc, 2mu, 2rk, 2wr, 3ab, 3adp, 3aha, 3ajd. 3alx, 3bnu, 3bva, 3cjn, 3hg, 3ig, 3lr, 3vw, 4gw, 4iz, 4kl, 6nx, 8adg, 8alf, 8fm, 8ih, 8nb, 9bht, nkf, sj, kdka, wgh.

Belgian, 4Y2

U.S.A.: 1add, 1abf, 1af, 1ajx, 1all, 1are, 1ary, 1auc, 1aw, 1aww, 1axz, 1bdx, 1bes, 1bgq, 1bhm, 1bie, 1bpb, 1bsd, 1bvb, 1cab, 1cak, 1cbg, 1cc, 1cme, 1pl, 1rr, 1yb 2abd, 2ag, 2agb, 2ajm, 2bg, 2bgi, 2bm, 2brb, 2bre, 2bsc, 2by, 2cei, 2chg, 2cpk, 2cvj, 2gk, 2kx, 2mc, 2mu, 2og, 2pd, 2rk, 3ab, 3bss, 3cc 3chc, 3ejn, 3hs, 3ig, 3sf, 3yo, 4du, 4jr, 4pk, 4sb, 4tj, 4xe, 6bny, 8dnb, 8doo, 8vq, 8xk. Canadian: 1ar, 3bp.

Santangeli, Mario, 1er,

S. Eufemia, No. 19, Milano, Italy.

1aao, 1af, 1ajx, 1all, 1auc, 1awy, 1bj, 1bpb, 1cc, 1cme, 1cvo, 1es, 1py, 1rd, 1wl, 1st, 2acb, 2axf, 2bum, 2cjx, 2epd, 2cqo, 2cqz, 2cvo, 2je, 2kx, 2rk, 2tp, 2xb, 3aaf, 3bng, 3bpm, 3bwj, 3in, 3kx, 3tf, 3wb, 3xw, 4au, 4fs, 4kl, 4ku, 4qf, 5bg, 5lh, 5ox, 5ar, 5uk, 8adt, 8afm, 8ame, 8bnh, 8bt, 8do, 8dps, 8tt, 9arp, 9efl, 9ei. Canada: 1ei, 1eg, 2am.

2AEY, 338 El Mora Ave., Elizabeth, N. J.

5aaq, 5abc, 5abj, 5acb, 5acf, 5acl, 5acm, 5ade, 5adk, 5ado, 5aed, 5aef, 5aek, 5aeq, 5aex, 5afg, 5afx, 5agn, 5ahd, 5air, 5aja, 5ajj, 5akf, 5akq, 5amu, 5amw, 5ana, 5anl, 5aph, 5api, 5agw, 5asb, 5ad, 5at, 5be, 5bj, 5br, 5bx, 5by, 5ce, 5co, 5ed, 5ek, 5ew, 5ez, 5hl, 5hy, 5in, 5jf, 5kc, 5lb, 5oq, 5pa, 5qz, 6ad, 5se, 5sk, 5un, 5ux, 5vu, 5wa, 5wi, 5yd, 5za, 6aao, 6afg, 6afh, 6agc, 6aqk, 6ahp, 6aiv, 6aif, 6aji, 6akw, 6alw, 6amo, 6anb, 6apw, 6arb, 6ase, 6awt, 6bby, 6bdt, 6bep, 6bgc, 6bhw, 6bip, 6bjj, 6bka, 6bkk, 6blw, 6bql, 6bqr, 6bui, 6bur, 6cct, 6cdn, 6cfe, 6cft, 6cfz, 6cgc, 6cgw, 6chl, 6cig, 6cmi, 6cms, 6cmu, 6cnl, 6cnn, 6cqd, 6crn, 6crs, 6crx, 6css, 6csw, 6cto, 6cux, 6ab, 6ac, 6cc, 6ea, 6eb, 6ew, 6fy, 6ih, 6il, 6in, 6ja, 6ka, 6km, 6kt, 6lj, 6of, 6pl, 6qi, 6rn, 6rv, 6ti, 6ts, 6ua, 6uw, 6vc, 6vd, 6wp, 6xi, 6ah, 7abb, 7adf, 7afo, 7ahi, 7ahv, 7ajy, 7co, 7cy, 7df, 7dj, 7fd, 7fa, 7gb, 7gj, 7jr, 7mf, 7mp, 7mx, 7rn, 7to, 7wm. English: 2cc, 2jf, 2kf, 2kz, 2nm, 2od, 2sz, 5nn. French: 8ab, 8ct, 8go, 8sm. Argentine: cb8, lpx. Mexico: hx, 1b, 1aa, 1n, 1r, 1x. Unknown: Pox, ur—(calling up de ur) QRA?

4BL, P. O. Box 51, Lakeland, Fla.

US. CW.—1aac, 1aae, 1aao, 1aap, 1abf, 1acb, 1ad, 1adb, 1adg, 1adp, 1af, 1agg, 1ags, 1aid, 1aim, 1ajg, 1ajh, 1ajo, 1ajp, 1ajx, 1akz, 1all, 1alw, 1amx, 1amf, 1ama, 1aoi, 1ar, 1are, 1ars, 1ary, 1atj, 1aw, 1awe, 1awy, 1axa, 1axi, 1axz, 1ayb, 1ayp, 1azn, 1bbe, 1bcc, 1ber, 1bdh, 1bdp, 1des, 1bfl, 1bgq, 1bhm, 1bhn, 1bie, 1bio, 1biq, 1bkq, 1bkr, 1blb, 1bnt, 1bpb, 1bqi, 1bsd, 1bub, 1bv, 1bvb, 1bvl, 1bvf, 1bwj, 1bwx, 1bz, 1bzq, 1cab, 1cak, 1chk, 1ci, 1cme, 1cmp, 1cmx, 1cpj, 1cre, 1cri, 1cru, 1cx, 1da, 1de, 1ef, 1fd, 1fx, 1ga, 1gs, 1hc, 1hn, 1id, 1il, 1iv, 1js, 1kc, 1lw, 1ml, 1my, 1pl, 1py, 1qv, 1rd, 1se, 1sf, 1tu, 1ve, 1vk, 1wl, 1xam, 1xu, 1xz, 1yb, 1yd, 1yg, 1st, 2aan, 2aav, 2aay, 2abt, 2ac, 2aco, 2acf, 2adj, 2afp, 2ag, 2agb, 2aja, 2ajp, 2apy, 2aqh, 2at, 2ate, 2atf, 2axf, 2asy, 2bbn, 2beo, 2bgl, 2bgo, 2bhm, 2bhn, 2bkr, 2blm, 2bm, 2bn, 2bqb, 2bqc, 2bqr, 2bqu, 2brb, 2btw, 2bum, 2bv, 2bvr, 2by, 2byg, 2cbg, 2cee, 2cei, 2cgb, 2cgi, 2chk, 2cjb, 2cje, 2cjx, 2ckh, 2cnk, 2cpa, 2cpk, 2cpo, 2cqx, 2crb, 2cty, 2cul, 2cvf, 2cvj, 2cvs, 2cvu, 2cxw, 2cyx, 2czq, 2car, 2dn, 2eb, 2ei, 2fk, 2gk, 2ha. 2hx, 2je, 2ke, 2kf, 2ku, 2kx, 2mc, 2mu, 2pd, 2pf, 2qs, 2rk, 2rm, 2sn, 2wb, 2wr, 2xi, 2xq, 2yg, 2zb, 6aad, 6aao, 6afg, 6afh, 6age, 6agk, 6ahp, 6ajh, 6aji, 6ajp, 6akw, 6ame, 6amm, 6ann, 6aoc, 6aoi, 6apw, 6arx, 6ase, 6auy, 6awt, 6ban, 6bau, 6bbv, 6bel, 6bgc, 6bgv, 6bhw, 6bhz, 6bir, 6blh, 6blw, 6bni, 6bnw, 6bpf, 6bph, 6bqa, 6bql, 6bra, 6bui, 6bur, 6can, 6cbb, 6cct, 6ccy, 6cfs, 6cft, 6cgo, 6cgw, 6chl, 6chx, 6ckf, 6ckw, 6clp, 6cmg, 6cmu, 6cnl, 6cnn, 6cqe, 6crx, 6cse, 6cso, 6css, 6csv, 6csw, 6ctx, 6cvf, 6cxr, 6cxz, 6cxx, 6ea, 6ew, 6fh, 6gg, 6hl, 6il, 6kb, 6lj, 6ld, 6ms, 6oi, 6pl, 6rg, 6rn, 6rv, 6ts, 6vc, 6vw, 6vy, 6wp, 6wt, 6xi, 6zh, 7afn, 7agi, 7agx, 7ahi, 7ajv, 7ey, 7df, 7dj, *7fd*, 7fq, 7fr, 7gb, 7gm, 7ku, 7lg, 7lq, 7lr, 7mb, 7mf, 7qd, 7sp, 7sy, 7uj, 7wm, 8abs, 8acm, 8ada, 8afm, 8afn, 8ago, 8ahk, 8ajn, 8ak, 8alf, 8aly, 8ame, 8aol, 8app, 8apr, 8atr, 8aub, 8aul, 8aup, 8axk, 8axn, 8avd, 8ay, 8aym, 8ayu, 8baj, 8bau, 8bbf, 8bbi, 8bbw, 8bcp, 8bdk, 8ben, 8bf, 8bgg, 8bhu, 8bhv, 8bit, 8bkh, 8blc, 8bnh, 8bof, 8bpl, 8bpn, 8bqr, 8brm, 8btf, 8bth, 8buk, 8bul, 8bwl, 8bww, 8bxt, 8byn, 8bzk, 8cbp, 8cc, 8ccn, 8ccq, 8cdt, 8ced, 8cei, 8cep, 8chk, 8ckl, 8cko, 8clc, 8cnl, 8coj, 8cp, 8cpy, 8cse, 8cta, 8ctk, 8ctu, 8cuk, 8cva, 8cwl, 8cwp, 8cx, 8cxm, 8cyh, 8cyi, 8cyo, 8dae, 8dal, 8dal, 8dbf, 8dbl, 8dcf, 8dfb, 8dgl, 8dgt. 8dho, 8dhw, 8dic, 8dnb, 8do, 8doo, 8doq, 8dsb, 8dse, 8dsn, 8ef, 8er, 8es, 8fm, 8fu, 8fy, 8gl, 8gx, 8hj, 8hp, 8ih, 8lw, 8mc, 8nb, 8on, 8ow,

8pk, 8pl, 8rg, 8rq, 8rt, 8rv, 8ry, 8sp, 8tr, 8ve, 8vq, 8vy, 8wa, 8ws, 8xav, 8xb, 8xe, 8zd, 8zg, 9aad, 9aal, 9aau, 9acq, 9adb, 9adg, 9ado, 9adz, 9aey, 9afq, 9agl, 9ahq, 9ais, 9aim, 9ajd, 9akn, 9al, 9and, 9aod, 9aoo, 9ape, 9aqp, 9aqr, 9arg, 9ars, 9atf, 9avz, 9aws, 9ayb, 9ayd, 9azj, 9azn, 9azp, 9bal, 9bcj, 9bcy, 9be, 9beu, 9bfi, 9bhl, 9bhj, 9bht, 9bhx, 9bhy, 9bis, 9biu, 9bje, 9bji, 9bjl, 9bkk, 9blk, 9bkr, 9blu, 9bmf, 9bmh, 9bmk, 9bmv, 9bna, 9bnk, 9bpd, 9bph, 9bpm, 9bpy, 9brz, 9brz, 9bsz, 9btl, 9buh, 9bva, 9bvo, 9bvz, 9bwp, 9bwu, 9bwx, 9bxk, 9bzv, 9cbg, 9cbk, 9cbz, 9ccm, 9ccs, 9edl, 9edo, 9cej, 9efl, 9cgn, 9cip, 9cir, 9cjc, 9cjt, 9cjv, 9ckh, 9cks, 9ckv, 9clj, 9clq, 9cmb, 9cmd, 9col, 9cow, (hi), 9cpo, 9csg, 9ctg, 9cuc, 9cuo, 9cvf, 9cvl, 9cvo, 9cvr, 9cvs, 9cxx, 9cyk, 9cne, 9czn, 9dad, 9dbf, 9dct, 9ded, 9del, 9dfd, 9dgw, 9dhm, 9dhr, 9diy, 9djg, 9dme, 9dmj, 9dms, 9dmz, 9dnd, 9dng, 9dpl, 9dqh, 9ddu, 9drt, 9dtk, 9dtt, 9dun, 9duu, 9dw, 9dxn, 9dyt, 9dyz, 9eam, 9eas, 9eeb, 9eet, 9efs, 9eib, 9eht, 9ejl, 9ekq. 9eky, 9ell, 9ep, 9es, 9ev, 9fj, 9fk, 9ga, 9il, 9jf, 9mm, 9mn, 9mp, 9nv, 9on, 9of, 9on, 9ov, 9pb, 9pw, 9qw, 9ry, 9ui, 9ve, 9vz, 9wu, 9xe, 9xl, 9zt, 9zv, 9xy. Canadian CW: 1ae. 1ar, 1dd, 1dj, 1dq, 1ei, 2ax, 2be, 2bv, 2eg, 3fe, 3gb, 3hh, 3ms, 3nf, 3qs, 3xl, 4er, 5go, 6vw. Cuban CW: 2ic, 2mk, "dx" qra? South American: ch9te, Lpx, ur, wja. Bermuda: "ber". English: 2jf, 2kf, 2nb, 2nm, 2od, 2lf, 6vp. Danish: 7ec. Mexican: 1aa, 1b, 1x, 9a, bx. New Zealand: 4aa. Miscellaneous: jf, fto, 8ssc, (QRA's PSE???).

5LG—5SC, Alamogordo, New Mexico.

1all, 1amf, 1bsd, 1bv, 1uw, 2ag, 2axf, 2bgi, 2brb, *2bsc*, 2cnk, 2ku, 2sb, 3bg, 3bva, 3ckj, 3hj, 3hs, 3ot, 4bl, 4eh, 4ne, 4si, 4tw, 4ua, 6awt, 6bas, 6bdt, 6bgl, 6buw, 6cet, 6ne, 6ux, 6vc, 6zh, 7afu, 7aib, 7dd, 7dj, 7fd, 7fg, 7gb, 7jf, 7ku, 7lr, 7ls, 7ot, 7wm, 8abs, 8any, 8aol, 8blc, 8cse, 8er, 8jq, 8nb, 8tr, 8vq, 8wo, 9aby, 9bcj, 9bdf, 9bmx, 9cvl, 9ze. Canadian: 1dq, 2am, 2be, 2eg, 4eo. Mexico: bx. New Zealand: 4ag, nkf.

6BJX, 2823 E. 6th Street, Los Angeles, Calif.

1ajo, 1bed, 1ci, 1cmp, 1lw, 1ml, 1ow, 1xt, 2atf, 2bgi, 2brb, 2cse, 2cjx, 2cxw, 2cyw, 2kx, 2xi, 3ab, 3auy, 3bdo, 3bva, 3cjn, 3hj, 3ot, 3qt, 3am, 3te, 4bq, 4eq, 4io, 4os, 4tj, 4xe, 5aai, 5aaq, 5acx, 5afn, 5afu, 5agl, 5aic, 5ail, 5aiy, 5ajb, 5akn, 5alj, 5alr, 5ame, 5amw, 5apy, 5aqw, 5aqy, 5asz, 5atf, 5atx, 5ca, 5cn, 5dm, 5hi, 5in, 5jf, 5lh, 5ll, 5ls, 5mn, 5nw, 5ot, 5ov, 5ph, 5qy, 5sd, 5se, 5uk, 5ux, 5wa, 5za, 5zai, 5zav, 7adm, 7afo, 7aip, 7ajv, 7ajy, 7akh, 7au, 7dj, 7fq, 7gb, 7gm, 7gq, 7gr, 7ho, 7jr, 7ku, 7lg, 7lq, 7lr, 7ma, 7mf, 7qd, 7qp, 7sp, 7sy, 7ws, 7zm, 7zz, 8ads, 8ah, 8amr, 8apr, 8avd, 8axk, 8bau, 8bnh, 8cyi, 8cys, 8dal, 8dph, 8ep, 8gx, 8hj, 8lr, 8nb, 8pl, 8ry, 8wa, 8ze, 8zg, 9abf, 9aby, 9acq, 9ado, 9asy, 9amx, 9axs, 9azr, 9bdf, 9bdw, 9bfi, 9bgh, 9bht, 9bhx, 9bhy, 9bje, 9bji, 9bmx, 9brx, 9bvo, 9bwc, 9bwx, 9bxk, 9ca, 9ccs, 9cea, 9cfi, 9cip, 9cja, 9ck, 9cks, 9cld, 9ctg, 9cvs, 9cxx, 9dac, 9dad, 9dbs, 9ddp, 9ded, 9dfx, 9dhs, 9dlt, 9dmj, 9dnd, 9dpx, 9dqu, 9dun, 9dwx, 9eae, 9eak, 9eam, 9ebh, 9efm, 9efy, 9egh, 9ego, 9eht, 9ek, 9eky, 9es, 9na, 9ve, 9zn, 9zy, a2ds, a2yi, a3bd, a3bq, c2ax, c2be, c4fu, c4gt, c5ba, c5ct, c5gf, c5go, c5hs, m-bx, z2ac, z2ap, z4aa, *z4ag*, z4ak, lpx, nkf.

Edw. C. Callahan—6BVP,
4022 Agua Vista St., Oakland, Cal.

1pl, 1bkq, 2ana, 2bqa, 2ds, 2wr, 3ejn, 4sb, 4tw, 5aaq, 5ahq, 5ajt, 5asz, 5dm, 5ew, 5kc, 5nj, 5ox, 5qy, 5rv, 5acy, 5apr, 5axk, 5bcp, 5ben, 5bfe, 5blc, 5cxy, 5ded, 5dbp, 5jz, 5nb, 5ry, 5up, 5vq, 5acq, 9axx, 9bdf, 9bhx, 9bhy, 9bnk, 9cdv, 9cea, 9cgn, 9ckb, 9eue, 9eul, 9dad, 9daj, 9dbz, 9imj, 9dng, 9oa, 9on, 9xi. Many 6's as 7's. Canada: 3nf, 4lo, 5hp. New Zealand: 2ap.

H. H. Schoolfield, Jr., 7CW,
838 Skidmore St., Portland, Ore.

1aac, 1abf, 1ajg, 1ana, 1are, 1ary, 1atj, 1aww, 1axy, 1bdx, 1bep, 1bpb, 1bv, 1bvl, 1bz, 1ckp, 1cmp, 1fb, 1ke, 1ow, 1pl, 1py, 1xw, 1yb, 1zt, 2acs, 2afp, 2ag, 2agw, 2anm, 2axf, c2ax, 2bgg, 2bgi, 2brb, 2bqu, 2cc, 2cnk, 2cal, 2dn, 2ku, 2rk, 2xq, 3ab, 3adv, 3aha, 3aja, 3apu, 3bdo, 3bob, 3bof, 3chg, 3cjn, 3hg, 3hh, 3hj, 3lg, 3mf, 3oq, 3vw, 3yo, c3zb, 4bq, c4dq, 4eb, 4eq, 4gw, c4io, 4io, 4jr, 4ku, 4tj, 4uk, 5aaq, 5acl, 5acx, 5afu, 5ail, 5aiy, 5alj, 5alz, 5ame, 5amc, 5ap, 5aqw, 5asz, 5atf, 5atx, 5bx, 5dm, 5nw, 5ot, 5ph, 5sd, 5se, 5uk, 5wy, 5xau, 5zav, 8ada, 8afn, 8ago, 8ah, 8aub, 8baj, 8bau, 8bdk, 8blb, 8bnh, 8bpa, 8bpl, 8btf, 8cbp, 8ccq, 8ced, 8cei, 8cpy, 8cse, 8dal, 8den, 8dae, 8dnf, 8doo, 8es, 8jq, 8kc, 8lw, 8pl, 8rv, 8tr, 8uf, 8wq, 8ze, 8zk, 9aau, 9acq, 9adg, 9adr, 9afz, 9agr, 9agy, 9aju, 9aki, 9alr, 9apa, 9atx, 9awv, 9axs, 9bcd, 9bfi, 9bgh, 9bhb, 9bht, 9bhx, 9bje, 9bkb, 9blk, 9bmu, 9bmv, 9bmx, 9bna, 9bnf, 9bnk, 9bnu, 9bob, 9bof, 9bp, 9bpy, 9bru, 9brx, 9buk, 9bwe, 9bye, 9bxk, 9can, 9ccm, 9ccs, 9cdv, 9ces, 9cej, 9cfh, 9cfi, 9cfy, 9cir, 9cks, 9cld, 9cmb, 9cov, 9cro 9cvo, 9cvr, 9cvs, 9dac, 9daw, 9dbz, 9ddk, 9del 9dev, 9dfh, 9dfz, 9dhs, 9dkh, 9dlw, 9dpr, 9dqh, 9dqm, 9dqu, 9dun, 9dwx, 9dwu, 9dyz, 9eak, 9eam, 9eas, 9eep, 9efs, 9egh, 9egu, 9el, 9eig, 9ej, 9eky, 9ell, 9fk, 9ul, 9ve, 9xi, 9zy, kdka, kfkx, nkf, wgh, wwv.

8ZE—8GX, Oberlin College.
E. W. Thatcher, Oberlin, Ohio.

6aao, 6ac, 6acl, 6adt, 6afg, 6agk, 6aha, 6ahp, 6akz, 6aiq, 6aiv, 6ajl, 6akw, 6alk, 6ame, 6amo, 6apw, 6aqd, 6arb, 6arx, 6ase, 6ats, 6awt, 6bau, 6bb, 6bdt, 6bge, 6bhz, 6bjj, 6bjx, 6blw, 6bnu, 6bny, 6bqr, 6bqu, 6caj, 6can, 6cg, 6cgo, 6cgw, 6cek, 6chl, 6cix, 6cjv, 6cla, 6cnl, 6crx, 6css, 6cqe, 6csa, 6csw, 6cto, 6cvm, 6cvx, 6cxx, 6ea, 6eb, 6gc, 6gt, 6ij, 6ne, 6of, 6oi, 6ol, 6pl, 6rm, 6ts, 6vc, 6vo, 6ui, 6ut, 6xi, 6sp, 7abb, 7afn, 7afo, 7agi, 7ahi, 7aib, 7bj, 7dj, 7fh, 7fq, 7gb, 7gr, 7ij, 7ix, 7iy, 7ku, 7lq, 7ls, 7mf, 7mp, 7nx, 7ot, 7sd, 7af, 7sp, 7ry, 7th, 7zm. Dalite: *6ase,* 6oi, 7qd, 7abb.

E. W. THATCHER, 8ZE-8GX
Oberlin College, Ohio.

6aao, 6ac, 6acl, 6adt, 6afg, 6age, 6agk, 6aha, 6ahp, 6aib, 6aiq, 6aiv, 6ajh, 6aji, 6akw, 6akz, 6alf, 6alk, 6ame, 6amo, 6apj, 6apw, 6aqd, 6arb, 6arx, 6ase, 6ats, 6awt, 6bau, 6bb, 6bdt, 6bge, 6bhx, 6bjj, 6bjx, 6blw, 6bni, 6bnu, 6bny, 6bph, 6bqr, 6bqu, 6bur, 6bve, 6bvg, 6cae, 6caj, 6can, 6cbb, 6gg, 6cgc, 6cgo, 6cgw, 6cek, 6cej, 6cfe, 6chl, 6cix, 6cjv, 6ckw, 6cla, 6cmi, 6cnl, 6cqe, 6crx, 6cso, 6cso, 6css, 6csw, 6cto, 6cve, 6cvs, 6cvm, 6cvx, 6cw, 6ea, 6eb, 6gc, 6gt, 6ih, 6iq, 6ne, 6nn, 6nx, 6of, 6oi, 6ol, 6pl, 6pw, 6rn, 6rm, 6ts, 6ui, 6ut, 6ve, 6vo, 6xi, 6xo, 6xh, 6zp, 7abb, 7afn, 7afo, 7agi, 7aha, 7ahi, 7aji, 7bj, 7dj, 7fg, 7gb, 7gr, 7ij, 7ix, 7iy, 7ku, 7lq, 7ls, 7mf, 7mp, 7nx, 7ot, 7qd, 7ry, 7sp, 7af. B3ad QRA? Canada: 5an, 5ha, 5cn, *5gt*. France: 8bo, 8ssc. Finland: 3gb. England: 2bv, 2kf, 2kx, 2nm, 2od, 2ss, 2yt, 5nn, 5lf, 6nf. Holland: Onl. Mexico: laa, laf, lai, lk, ln, dn, lx, bx. Porto Rico: 4sa, 4oi. Cuba: 2ic, 2mk. New Zealand: 2ac, 4ak. South America: WJS.

9DYT, Ladoga, Indiana.

6abx, 6afg, 6afh, 6agt, 6ahp, 6alb, 6akw, 6alf, 6alo, 6alv, 6alw, 6amf, 6ano, 6apw, 6arb, 6asb, 6ase, 6atp, 6atq, 6atw, 6auy, 6bcf, 6bhw, 6bhz, 6bir, 6bjj, 6bjx, 6bmo, 6bms, 6buc, 6bui, 6bur, 6bve, 6bvj, 6cbb, 6ccf, 6cct, 6ccy, 6ceq, 6cge, 6cgo, 6chl, 6cix, 6cka, 6clp, 6cmg, 6cmq, 6cmu, 6cqe, 6crb, 6crr, 6crs, 6cso, 6css, 6cte, 6cvp, 6cwi, 6cxx, 6dd, 6ea, 6eb, 6ek, 6eo, 6ew, 6gu, 6ih, 6il, 6ia, 6oi, 6pl, 6qi, 6rn, 6rv, 6ua, 6ut, 6vc, 6vf, 6vw, 6xad, 6zby, 6xi, 6xwi, 6yb, 6zh, 7abb, 7af, 7afn, 7afo, 7aha, 7ald, 7av, 7cy, 7df, 7dj, 7fg, 7fn, 7fq, 7fr, 7gj, 7gm, 7gq, 7gs, 7gy, 7ho, 7ij, 7iu, 7jq, 7ku, 7lj, 7lr, 7ls, 7oh, 7ok, 7qd, 7sb, 7af, 7uj, 7vn, 7wm, 7wq, 7zn, 7zz. Canadian: 1ae, 1af, 1ai, 1an, 1ar, 1dd, 1ei, 2bv, 2ci, 2ck, 2fo, 3acf, 3aec, 3aef, 3ael, 3afz, 3ck, 3hl, 3ia, 2kq, 3nf, 3ni, 3oh, 3sp, 3ws, 3xi, 3zb, 4bb, 4cb, 4er, 4dq, 4eo, 4fn, 4fv, 4fz, 5ah, 5ak, 5ay, 5ba, 5gf, 5go, *5he*, 5hp, 9ak, 9bj. P. R.: 4sa, 4je. Cuban: 2by, 2mk. Mexican: bx, le, lx, N. Z.: lao, 2ac, 2ap, 4aa, 4ag, 4ak. Aust: 2cm, 2ds, 2yg, 2yi. England: 2jf, 2kf, 2ls, 2nm, 2od, 2sz, 6nf. Others: PRG (qra?)

Communications

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Aluminum Analysis Data

539 Fourth St.
Niagara Falls, N. Y.

Editor, *QST:*

I am a chemist, engaged in analytical work, and familiar with the quality of aluminum on the market, so when I observed chemically pure aluminum sheet advertised in *QST*'s Ham-Ads, I sent to two firms and give below the analytical results on the metal sold me.

Sample No.	Aluminum (by diff.) %	Silicon %	Iron %	Copper %	Manganese %
1	99.00	0.29	0.41	0.28	0.02
2	99.27	0.27	0.34	0.11	0.01

Sample No. 2 represents about the average commercial sheet aluminum, while No. 1 is of a somewhat lower grade, just within the usual limits for sheet metal.

Of course, there is no such thing as chemically pure aluminum on the general market and it savors of misrepresentation to so advertise it. Aluminum metal of 99.95% purity has been made, and by stretching a point, one might call aluminum of above 99.45% or electrical conductor grade, chemically pure.

Now, as regards aluminum as a rectifier. I have not seen a comparison of different grades of aluminum in their rectifying action. Of course it is known in general that the purer the metal the better the rectifying action. Most of the common alloys of aluminum probably would not act at all—such as the 3 S alloy (1 to 1.5% Manganese) used for utensils—and accounts for considerable of the difficulties run into by amateurs. It might be possible for me to get some pure aluminum and run tests. If interested, I would be glad to get your ideas on this subject.

—*John L. Benham.*

A Cheap Transmitting Condenser

Theta Chapter of PSI Upsilon
Union College,
Schenectady, N. Y.

Editor, *QST*:

The W. T. Grant department stores are selling a twenty-three plate *balanced* variable air condenser known as the "Grantco". This has two stator sections insulated from each other and while looking it over one day, it occurred to me that it might be used in a transmitter. This is done by removing the little connecting link on the back which connects the two stators and running your connections from each set of stator plates.

It has a resistance of about .6 ohms at a million cycles and seems to stand up very well without breaking. I have used it on a 450-watt input transmitter (2-UV211) using one in antenna circuit and one in primary circuit and have put strong signals into the West Coast and England on very "lousy" antenna.

The price is $2.50 and apparently it delivers the goods.

—*Edmond B. Redington, 2XQ*

Re: QSR's

62 Bruce Ave.
Yonkers, N. Y.

Editor, *QST*:

How many times have we heard fellows get the razz for poor judgment in routing messages? If some Kansas station has a message for New York City and gives it to a first district station in Boston for QSR its the cue for everyone to hand him a nice ripe raspberry. But, after all, did he really show poor horse sense? In my estimation he was doing just as well as he would have done had he given the message to a station in Harrisburgh, Pa. Ever since the A. R. R. L. has taken account of the messages handled a fellow has been subject to being called thick if he didn't handle his messages as though he were operating a telegraph land line. Can't we break away from that? Aren't radio waves supposed to travel in circles? If we have a message for a certain point, say it's Saint Louis, and we hook up with a station 300 miles from Saint Louis why not let him have it if he says he's QSO? Does it make any difference whether he's in Iowa, Tennessee, Illinois, Kansas, or Arkansas? Not a bit of it! North, south, east or west, it's just as easy to QSR, and just as sensible. (This is said without considering unusual local conditions that may affect transmission.) Think it over. A station in Kansas, three hundred miles from Saint Louis should be able to QSR just as well as a station in Illinois, three hundred miles from Saint Louis. Hw? It always seemed funny to me that a fellow felt no mistake was being made if he QSR'd to a station in a direct line to the

destination of the message, but if a station on the *other* side of the destination, the *same distance away*, was raised it would have been a *horrible* mistake, punishable by some unheard-of torture. I can't see it.

—*E. Peacox, 2ADH.*

On Connecting Phones the Right Way

480 E. 23rd St.
Brooklyn, N. Y.

Editor, *QST:*

Re. the article from "Radio" (Australia) on page 65 of the November *QST* on determining the proper poling of telephone receivers—a very simple and certain means of determining this is to look at the image of a small light source reflected in the diaphragm. When direct current is sent thru the windings, if the light image becomes larger the diaphragm is drawn toward the magnets and the poling is correct. If the light image becomes smaller the diaphragm springs away from the magnets and the poling should be reversed. Better check both receivers of the set to make sure they are not reversed against each other. The poling of loud speakers, which do not use a balanced magnetic circuit and thru which the space current is fed directly, is as important as for headsets.

—*H. C. Silent.*

Reception in China

Macao, China.

Editor, *QST:*

If two years ago someone told me that in Macao the American amateurs could be heard, I would have smiled and sent him to catch flies. But today I shouldn't, because the 8000 miles of the Pacific are nothing to the transmitters of the A. R. R. L. They come nicely across the water and strike my ears, the sole amateur at Macao.

The last year with my Reinartz I picked up almost all the Phillipine amateurs. However, ambitious, as all true hams, I wanted to go farther—Australia, New Zealand, U. S. A., if possible. I saw the records of Braggio, Ivan O'Meara, Deloy, and others, qui je passe, on short waves and resolved to try to beat them. I arranged a Weagant and began to fuss. "The Americans Come!", I cried to myself, for they did. 3BG, 4AA, 2CM, 4AG, 2AC, 2AY, 4AK, 2WR, the first nights. Some of them, 4AA, 3BD, 4AG, without aerial or earth. And the distance was more than 4000 miles. Afterwards 6XI calling KJE, very QSA without aerial; 6CMU calling CQ. N.Z.; and, some minutes later, 6AWT calling 2AC of New Zealand. Also 6SF on pure C.W., on 100 meters nearly, calling CQ. There were more, too, but a Jap station with its harmonics on the short waves marred my reception. But, I don't care; I heard America.

It is interesting to note that I have no vernier condenser, nor have I ever known a low-loss condenser. The tuning was very sharp and the vernier was my left hand, his capacity, while the right one wrote the names of those Americans in the history of the progress of radio-telegraphy on short waves.

—*J. Rocka Saraiva.*

Frozen Rectifiers

903 Ross Avenue,
Wilkinsburg, Pa.

Editor, *QST*:

Saw lil article in Quist about rectifiers freezing up. Am here to state that they do, muchly. Have 136 jar rectifyer here and has been frozen up about four times in past winter. Now the funny part of it is that the rectifyer gives better DC and passes a higher voltage when frozen solid. Maybe its my imagination about the better DC but I do get higher voltage. All the times that my rectifyer was frozen I thawed it out by running the set. None of the jars have cracked from this as yet. May add that the station is in second floor of garage and gets very frigid at times. Wrote you a card short time ago about capacity coupling and you sed ND. Inspector gave me license using .00005 μfd. coupling condenser. Guess because of extremely small capacity. Suppose that's all. 73,

—*P. Graham Lambert, 8CEI.*

Re: Marconi V-24

48 Lavender Gardens,
London, S. W., Eng.

Editor, *QST*:

I see a reference in your September issue to Marconi V-24 test-tube shaped valves with separate anticapacity outleads for plate filament and grid. It may interest you to know that altho the V-24 pattern valves can still be obtained, later patterns of similar anticapacity valves are on sale here and known as the Q and QX types. There is no doubt they are first class for s/w work. What we call dull emitter and you call dry cell tubes of similar pattern are also available with price of six dollars. Some patterns of Q valves work without grid leak and condenser, a material matter on short waves.

If any of your readers want any English tubes and care to trust to the post for safe delivery and will remit me sufficient cash, I will be pleased to do what I can to help them. They need not think I shall do in their cash as I may mention I am by profession here a Solicitor of the Supreme Court of Justice in England. Don't forget

to tell them to send enough for postage and packing.

Yours faithfully,
—*A. F. C. Boyes, g5XZ.*

An English Ham's Complaint

22 Park Road, Collier's Wood,
London, S. W. 19.

Editor, *QST*:

During the last two months, owing no doubt mainly to the fact that the new 70 to 80-meter band is being well employed in the U. S. A.,—British Hams have no difficulty in logging American stations each night by the dozen, using only single and two tube sets for the job, and a few comments on this new band of waves by an English "DX merchant" may prove of interest.

The two main points about the 70-80 region are the marked increase in signal strength on this side of stations who were QRZ over 100 meters and the almost entire absence of the so-called "fading" trouble, but even with these improvements the British Ham has one or two difficulties to contend with when logging the "U's."

The first and worst trouble is the "CQ" habit, which is to say the least, very trying; an instance is quoted herewith:— An American amateur station is tuned in well and true pumping out a few hundred "CQ's" and follow up with a "U" break sign and a very hurried and much jumbled 3 letter call sent about three times, which becomes unreadable over here and so a chance of logging some distant inland station or perhaps effecting contact is lost. The remedy is simple and just as pretty—CQ three times–break–give your call three times in a decent firm fist, properly spaced out and you stand a good chance of being logged over here, if no reply is received within a few minutes repeat the dose, and it will be found that a good deal of time and current is saved and a much more useful purpose accomplished.

The next "grouse" is the entire absence of listeners on the 80 to 100-meter range, where most of the workable "G" stations are to be found at the present time (their permits do not allow them to work below 90 meters at present). Perhaps this is just as well for the QRM around 75-80 must be pretty fierce on the American side—95 mts. is a very good standby wave and more attention should be given to this wavelength after midnight G. M. T. To get QSO with the U. S. stations at the present time the poor "G" has to turn out at 2 or 3 a. m. from a nice warm bed these autumn days, and nothing is more trying than to listen to half a dozen "U's" CQing their hearts out only to finish up with a hurried call sent only once or twice in a very difficult fist, and then relapse into silence, probably searching 70-80 meters for something they don't get—whilst we call till we develop cramp, without result. Hams on this side are looking forward to the coming winter as likely to be the most interesting one yet experienced in short wave amateur radio, if it is not cluttered up with useless CQing for hours on end.

It should be remembered that British stations may not handle private traffic on any account whatever, so please do not pile us up with such messages. Of course any message relating to another amateur station on this side or to any test or report is permissable and is welcomed by our men.

A great help to both sides this season would be the use of the "GU" intermediate by "U" stations when CQing before changing over to listen for a reply from this country:—for example a British station hearing a call—CQ gu 1XX—would know that the station was on the lookout for "G"s on 95 meters and would call at once. We are not allowed to "CQ" but "A. R. R. L." ug g2PP or a "U. S. A." ug g2PP means the same thing and the hint should be taken by your fellows.

A few criticisms by one of your Hams on our stuff would be of great interest on this side. 73's

—*J. A. Partridge, g2KF*

Some Real Traffic Ideas

15 Churchill Ave.
Toronto, Ont., Canada.

Editor, *QST:*

I've often seen your request in *QST* for ideas to improve traffic management or for the traffic department. No doubt you would like to get rid of some of the bad habits of the gang, and I have thought of an idea that might contribute to the abolishment of the "CQ" bogey, which is an insufferable nuisance and gets one nowhere.

Here it is:—If I am an amateur in Canada and want to get in communication with a U. S. amateur, instead of sending CQ for fifteen times (in the meantime several hundred listeners-in have disgustedly tuned somewhere else) and leaving my hearers in some suspense as to who and where I am, I send—

"UC UC UC UC 3MR 3MR UC UC UC UC 3MR." etc.

Thus if I am an amateur in the U. S. and am QRV for traffic, or have some for Canada, I will wait to hear the call, etc. If I am just a receiving amateur, say, way down South, I know that this will be pretty fair DX and wait for the call.

If a U. S. amateur wants to get in communication with another U. S. ham in another district, he calls—"4U9 4U9, 4U9ZT" and gets down to business more rapidly. CQ'ing is "too broad" to get one anywhere. This suggestion may not be so good for

working within one's own country, but for cutting out CQ'ing between countries, I believe it would work O. K. To listen to some of the gang calling CQ for 20 times and many long drawn-out "EUROPE's," would get any European amateur in a froth.

Possibly you can improve on the idea; I think the best thing about it is that the listener knows practically at once the location of the amateur who is sending. It's worthwhile waiting a few minutes when hearing this—"UG UG UG," than when hearing this CQ CQ CQ ad nauseam. What do you think?

—Barney Kellam, c3MR

(Note: We want to be certain that you understand this. It is a first-class idea. You have a message for Canada but you hear no one that you can raise. To indicate that you are a U. S. station calling Canada you start CU CU CU 5MMM 5MMM, etc. Any Canadian amateur hearing that CU will know you mean his country and that you are in the States with a message for him. The district to district procedure is the same with the numerals in place of letters. Ed.)

(We should like to endorse this idea as excellent. It might obviate the CQ evil, so we wish the operating personnel to give it a trial, to report what they think of it and how well it works. If as successful as it deserves to be, it will be adopted as standard A.R.R.L. operating practice.

—F. H. S.)

This Is Good

Editor, *QST:*

It has occurred to me that by means of a simple code of letters used after a station finishes calling or CQ'ing, much useless transmission would be eliminated.

The amateur wave bands are pretty well settled now so why not letter each group as follows:

A.....	150	— 200	meters
B.....	75	— 85.7	"
C.....	37.5	— 42.8	"
D.....	18.7	— 21.4	"
E.....	4.69	— 5.35	"

Example: CQ CQ CQ u 2EX ar k B.

This would indicate that 2EX would listen for replies on B range. Many receivers designed for the short waves cannot tune above 150 meters while other tuners designed to cover the B and A ranges will be unable to tune in the other ranges. I believe the adoption of this or similar scheme would stop a lot of QRM.

—B. B. Jackson, 2EX.

A DESCRIPTION OF THE JENKINS SYSTEM FOR THE TRANSMISSION OF PICTURES BY AMATEUR RADIO

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May Issue of QST

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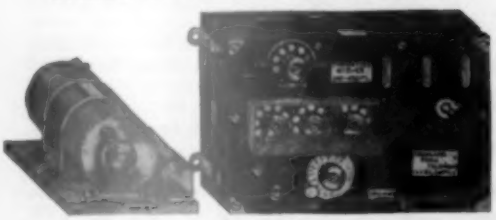

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				Order by following Types	Days between Chargings
5-Volt Tubes	1	UV-200	1	69 WHR	22
				OR	
				67 WHR	16
	2	UV-201A	½	67 WHR	33
	2	1 UV-200 1 UV-201A	1¼	611 WHR	22
				OR	
				69 WHR	17
	3	UV-201A	¾	69 WHR	29
				OR	
				67 WHR	22
	3	1 UV-200 2 UV-201A	1½	611 RHR	21
				OR	
				69 WHR	14
	4	UV-201A	1	69 WHR	22
				OR	
				67 WHR	16
C-300 and UV-200 are interchangeable	4	1 UV-200 3 UV-201A	1¾	613 RHR	22
				OR	
				611 WHR	15
C-301A, DV-2 and UV-201A are interchangeable	5	UV-201A	1¼	611 WHR	22
				OR	
				69 WHR	17
	5	1 UV-200 4 UV-201A	2	613 RHR	19
				OR	
				611 WHR	13
	6	UV-201A	1½	611 RHR	21
				OR	
				69 WHR	14
	8	UV-201A	2	69 KPR	21
				OR	
				67 KPR	15
	For sets using current at a rate higher than 2 amperes.		2¼	69 KRL	22
				OR	
				67 KPR	13
			2½	69 KRL	19
				OR	
				69 KPR	16

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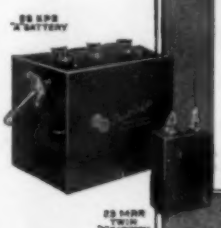

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To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

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American Radio Relay League,
Hartford, Conn.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose $2 ($2.50 in foreign countries) in payment of one year's dues. This entitles me to receive QST for the same period. Please begin my subscription with the .....issue. Mail my Certificate of Membership and send QST to the following name and address.

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Station call, if any .....

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Radio Clubs of which a member .....

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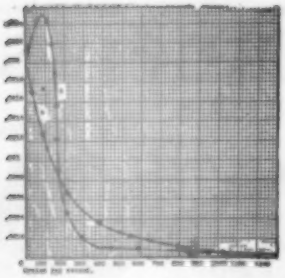

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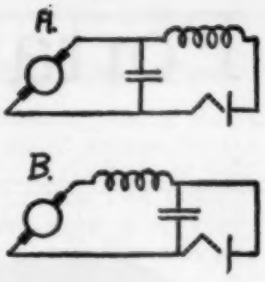

In a circuit containing constant values of inductance and capacity in series the distribution of the voltage across the various elements will be dependent upon the impressed frequency i. e. in B for a constant ripple voltage the voltage across the condenser will vary for various frequencies. The ripple voltage across the condenser is the ripple voltage across the tube. For high impedance loads across the condenser, such as a tube, this voltage rises to several times the value of the initial voltage. The peak of this rise is reached at a frequency slightly less than resonance. With increased frequency beyond resonance this voltage decreases rapidly soon becoming but a small fraction of the impressed voltage. The amplitude of the fluctuation of the current thru the plate circuit will vary with this voltage. Curve "B" shows the value of this current with the very excessive ripple voltage of 10 volts, a choke of approximately 10 henries and a one microfarad condenser, used with a "5 watter".

Fig. A shows the "cart before the horse" i. e., the voltage across the condenser will be full ripple voltage. The voltage across the plate will vary only as the impedance of the coil in series with it varies. This our curves tend to show is a better filter at frequencies below resonance than "B" but not as good above resonance. "B" seems to be the most practical of the two. Roughly speaking it will magnify frequencies below resonance and greatly decrease those above. This means that its effectiveness depends upon designing it with as low a resonant frequency as possible, i. e., both inductance and capacity as large as possible.

These curves are plotted to an exaggerated scale. The maximum value is .0024 amperes and the minimum .0000025 amperes.

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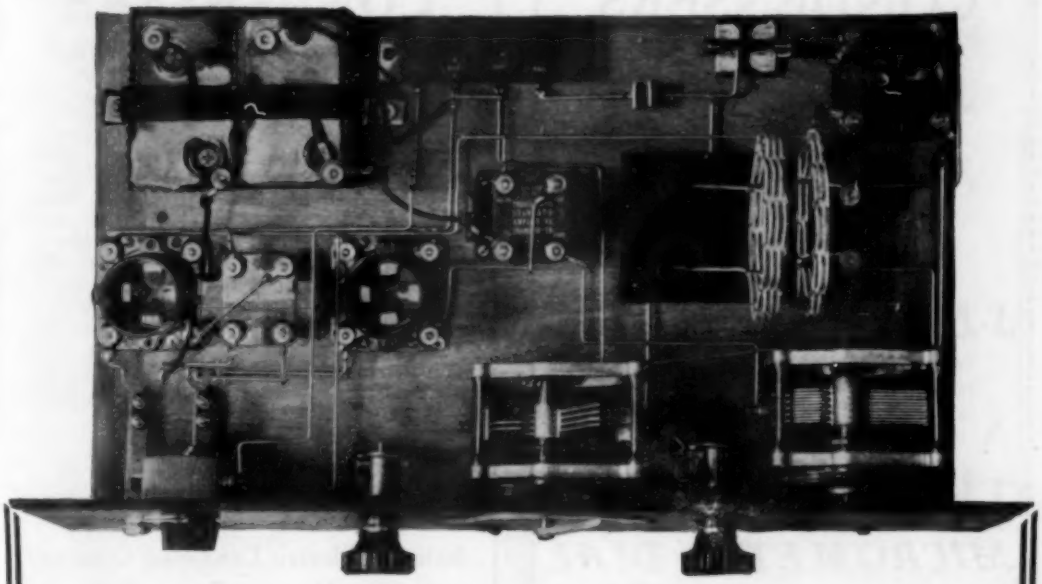
Schnell's Tuner



Uses B-T Condensers

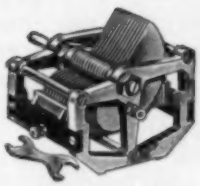
F. H. Schnell, Traffic Manager of the A.R.R.L., goes with the fleet in its much heralded maneuvers in Pacific waters. He is to conduct the Navy-Amateur experiments in short-wave communication. The special receiver that he will use is able to tune to twelve meters.

The enormous frequencies encountered at low wave lengths, 25 million per second at 12 meters, demands the utmost in condenser efficiency. It is significant that Schnell chose B-T Condensers for his set.

A.R.R.L. Men Use B-T Tuner

The B-T Tuner will be found in such stations as those of Kruse, Technical Editor of QST; Clayton, "Current Radio" Editor of the League; and Budlong, Assistant Traffic Manager.

When B-T parts are chosen by the men who know their quality cannot be denied.



B-7 Type L Condenser

B. T. Short Wave Tuner

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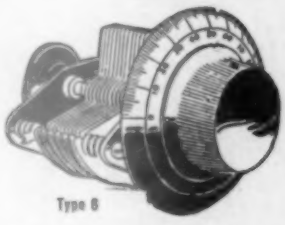

Type S

S-E-L-E-C-T-I-V-I-T-Y

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INTRODUCING THE
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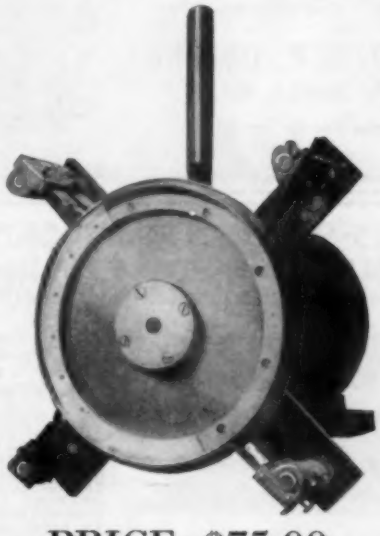
THE SYNCHRONOUS RECTIFIER THAT CAN BE FILTERED

At last a form of rectification which equals the accomplishments of an expensive motor generator. Rectification without the usual voltage drop; without the inconvenience of changing materials, with its resulting loss of power, which is the main disadvantage of the common chemical type rectifier. The original principle of synchronous rectification is used. Wherein this rectifier differs from previous types of "Syncs" is in the construction of the commutator. The "SUPER-SYNC" is so constructed that capacity with a small choke in series may be put across the out-put brushes without the usual "Fireworks." This makes it possible to filter the plate supply effectively and eliminate "Local QRM" which has been one of the disadvantages of Synchronous Rectifiers heretofore.

The "Super" easily handles up to four thousand volts at two hundred and fifty milliamperes; representing one kilowatt of power rectified while using a filter of the ordinary "Brute Force" type. The ability of a pure DC tone to carry through QRN and other disturbances is well known, and has been again proven at station 9DMJ where a "Super" has been in operation for some time. At this station while testing with long distance amateurs, the DC tone is always reported much more QSA and steady than when the RAC tone is used which is obtained by disconnecting the filter.



PRICE $75.00
F.O.B. ST. LOUIS

A few facts concerning the construction of the "Super-Sync": The commutator is 8" in diameter and is driven by a ¼ H.P. 1800 R.P.M. Sync. motor. Micarta is used for insulation and eight brushes mounted in pairs serve to conduct the current.

MARLO ELECTRIC CO.
5241 BOTANICAL AVE., ST. LOUIS, MISSOURI

POWER

When it comes to making a loudspeaker deliver the goods, there's nothing like a pair of AmerTrans.

Built to operate by the pair, they secure from two stages all you could possibly hope for in audio amplification. Look for a pair of AmerTrans in the set you buy—use them in the sets you build. Learn just what the famous AmerTran "kick" means — and then get a loudspeaker to *take* it.

AmerTran is made in two types, one quality—
A F 6—ratio 5:1 and A F 7—ratio 3½:1.

Buy Them by The Pair!

Price either model — $7.00 at your dealer's.

Send for Blue print and circuit sketches, showing the use of AmerTrans in the new Hoyt System of Signal Augmentation—enclose only 4 cents for postage.

AMERICAN TRANSFORMER COMPANY

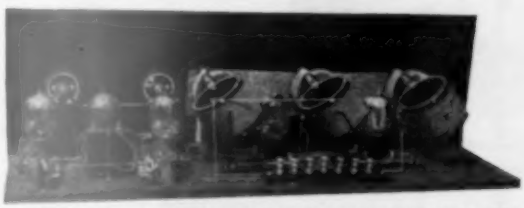
176 Emmet St. Newark, N. J.

"Transformer builders for over twenty-four years"

BUY DIRECT FROM THE MANUFACTURER

All Parts Complete to Build the Famous 5-Tube A & P Standard Neutrodyne

Enormous demand and enlarged production permits us to offer this Standard Kit at this greatly reduced price.



(Cabinet to fit panel 7" x 24" $4.95 extra)

29.95

THE NON-RADIATING, NON-SQUEALING, NON-HOWLING SET THAT HEARD ALL EUROPE DURING RECENT INTERNATIONAL TESTS. COMPLETE WIRING DIAGRAM AND DRAWING FOR PLACING OF PARTS FURNISHED WITHOUT EXTRA CHARGE. TUNES TO HIGH AND LOW WAVE LENGTHS AND STATIONS CAN BE FOUND REGULARLY ON SAME DIAL READINGS, ALL PARTS MADE IN OUR FACTORY ACCORDING TO NEUTRODYNE SPECIFICATIONS. FULLY GUARANTEED. THE PARTS ARE AS FOLLOWS:—

3 Variable Condensers, highest grade, capacity .000375
3 Neutro-Coils, silk wire wound on genuine bakelite tubing
6 Mounting Brackets
2 Neutralizing Condensers (set of parts with glass Dielectric)
5 Bakelite Sockets
1 20 Ohm Rheostat (Bakelite)
1 6 Ohm Rheostat (Bakelite)
2 Audio Transformers
3 4-inch "Vernigrip" dials
3 Improved Zero Capacity Jacks
3 Mica Fixed Condensers (capacities .006, .001, .00025)
1 Tubular Grid Leak
Grid Leak Mountings
Bakelite binding post strip
7 Binding Posts
10 Lengths Bus Bar
2 Lengths Spaghetti
1 Panel, neatly drilled for mounting of all parts at correct angles, including jacks
Blue Print (large, with complete and simple Diagrams)
1 Copper Sheet (for shielding)
1 Print for placing parts
1 Specially-treated base board

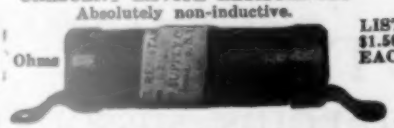
MAIL ORDERS GIVEN PROMPT ATTENTION

ATLANTIC & PACIFIC RADIO CORP., 223 West 34th St., New York City

CRESCENT LAVITE RESISTANCES

Absolutely non-inductive.

12,000 | 48,000 | 50,000 | 100,000 Ohms



LIST $1.50 EACH

Special resistances to order $2.50. When better resistances are made they bear the Crescent label.

CRESCENT RADIO SUPPLY CO.

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Send for printed matter concerning

THE GOODMAN

the niftiest short-wave tuner on the market. Made by L. W. GOODMAN, Drexel Hill, Pa. Gene Hummer Sta. 4UA, pictured on page 50, December QST had KGO as early as Sept., at Dundee, Fla., on his GOODMAN tuner. Get that—Sept.—Fla.—Calif. Not so bad!

DUPLEX CONDENSERS

The Accepted Standard

You fellows who **know radio** are responsible for the fame of **DUPLEX Standard** condensers. You have tested them in comparison with other excellent instruments—and your testimony acclaims them as supreme for short-wave use. Rotor plates are die-cast in their shaft. Stator plates are forced into undersize slots. Maximum to minimum capacity ratio is high, as plates are closely spaced. Maximum and minimum capacity are plainly shown on the box. If you are not a **DUPLEX** booster, you are not a **DUPLEX** user. Become both **now!**

A DUPLEX KIT of Matched Condensers Affords Uniform Dial Settings

You know the impossibility of uniform dial settings on a Neutrodyne or other T. R. F. set unless condensers and coils are accurately matched. A **DUPLEX KIT** of three specially tested and matched **DUPLEX Standard** condensers, packed in a sealed box and **guaranteed** uniform, takes care of your condenser worries. And by seeing that the turns of wire on your coils are evenly spaced, matching the coils is only a few minutes work. Be sure the **DUPLEX KIT** you buy bears the laboratory seal.

Instructive literature sent on request

Duplex Condenser & Radio Corp., 32 Flatbush Avenue Extension, **Brooklyn, N. Y.**

Best At The Price

You know that if you want the best, you must pay for it. You can't get a $7.50 condenser for $3.00 anywhere. But you can get a **DUPLEX Junior.** They are not quite so fine an instrument as the **DUPLEX Standard**—but they are better than any other condenser at the same price. Rotor plates die-cast in shaft. Stator plates forced into undersize milled slots. Closely spaced plates. Maximum and minimum capacities shown on box.

You *must* know the principles of RADIO

Every "ham" should have this basic radio textbook at his elbow

"Radio Devices and Communication"

Compiled by HARRY F. DART, E.E., formerly with the Western Electric Co., and U. S. Army Instructor of Radio
Technically edited by F. H. DOANE

386 PAGES—234 ILLUSTRATIONS

THIS is one of the volumes of the International Library of Technology. No matter how long your experience or how thoroughly you have studied radio, you will find this book of great value. And if you are just beginning, then *of course* you won't be able to do without it! As valuable in the shack as a cross-word dictionary in the parlor! There's not a question on the fundamentals of radio that cannot be answered by reference to this book, clearly, simply, *immediately*. Note this partial list of contents—

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Please send me a copy of "Radio Devices and Communication." I will either send you $5 in five days or return the book.

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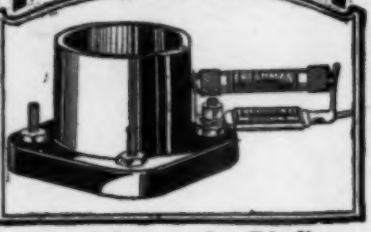
No Leads! Low Loss!

THE ONLY PERFECT MICA GRID CONDENSER

FRESHMAN



Fits right on the Binding Post of the Detector Tube

It is both a grid condenser and a perfect grid leak mounting, made in .00015, .00025, .0005.

At your dealers, otherwise send purchase price and you will be supplied without further charge.

Chas. Freshman Co. Inc.
Radio Condenser Products

FRESHMAN BUILDING
240-248 W. 40th St., New York

40¢

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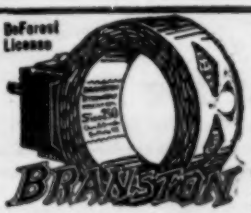

Honeycomb Coils

Back and Front Panel Mountings
Plain or Geared
Genuine Bakelite

The Universal all-wave inductances — accepted as standard in regard to superior construction and electrical units of measurement. Ask your "Old Timer" radio friend why sets using honeycomb coils are better; they give closer tuning, greater selectivity and range. No dead end losses, easy to operate. 16 sizes, mounted and unmounted. Interchangeable with all mountings.

Send 25c for Super Heterodyne, Radio Frequency and Honeycomb Coil Circuits and Complete Catalog.

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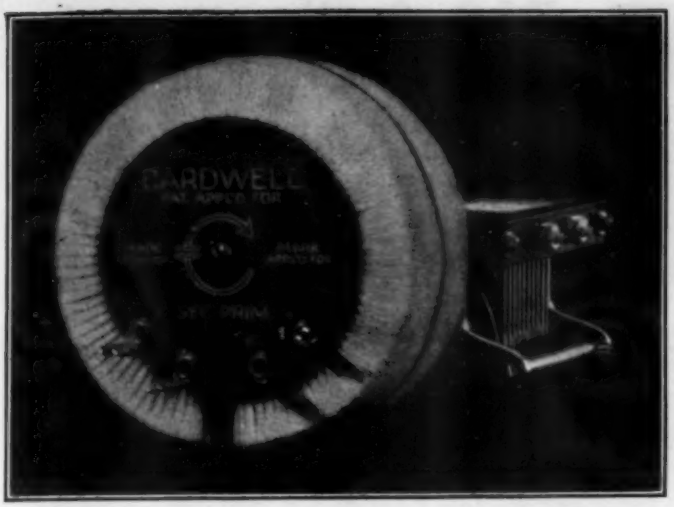
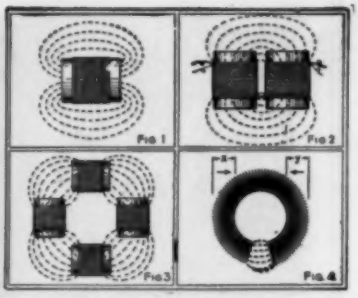




General Theory of the Toro-Tran

Figure 1 shows how the field of the ordinary coil extends into space and increases losses due to stray field. Figure 2 shows a "double series" winding, which restricts the field somewhat. Figure 3 shows a "four series" winding and the field almost enclosed. In Figure 4 (the Toro-Tran) the field is entirely enclosed and the losses due to stray fields are eliminated.

Note that a stray signal passing through the coil at "X"—not introduced from the aerial or the tube—is balanced out at "Y" by the reversed polarity of the winding. This rejects undesirable signals, while the concentrated internal field builds up the tuned signal. Hence maximum distance and selectivity.

—and now the TORO-TRAN!

CARDWELL, whose pioneer "low-loss" condenser established new standards of radio efficiency, is now introducing the Toro-Tran*—the ideal *balanced* coupling inductance for all radio frequency work.

*TRADE MARK
Registry applied for

The Toro-Tran eliminates signal energy picked up by ordinary coils from nearby stations. It eliminates magnetic feed-back in multi-stage radio frequency circuits, thus removing the most active factor in causing howling and distortion, and thereby increasing selectivity and distance. It rejects almost entirely the interference effects caused by electrical power machinery, elevators, door-bells, arc stations, etc.

The Toro-Tran winding confines the field to the inside of the coil, a small area, and thus avoids one of the greatest causes of loss known to radio receivers—that of stray magnetic fields, which result in the absorption of signal energy and reduce the efficiency of the receiver tremendously.

Note these unusual advantages in assembly and operation

1. Compactness. The coils do not require spacing or angular mounting. They occupy less space than your condensers.
2. Permit exact nullification for tube and stray capacity without guesswork or tedious testing.
3. Closed magnetic field eliminates magnetic feed-back in tuned radio frequency amplifiers.
4. Low distributed capacity, due to air spacing of each winding and to low voltage-drop per turn of small diameter wire.
5. Maximum coupling and high ratio of voltage increase due to concentrated field with zero leakage.
6. Absence of all supporting insulation in the field of the coil. This is one of the greatest loss factors in the ordinary circuit and is not remedied by "skeleton" or so-called "low-loss" windings.
7. Ease of neutralizing oscillation due to tube capacity by means of rotating control, which anyone can "balance."
8. Low capacity between primary and secondary, affording maximum transfer of energy to succeeding grid circuit.

The Toro-Tran has a lower "circuit resistance" (i.e., effective resistance as assembled in a set and not as isolated in the laboratory for theoretical measurements) than any inter-stage tuned transformer made and has a correspondingly higher amplification factor, its ratio exceeding ten.

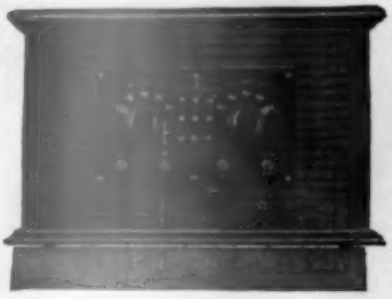
To appreciate the many remarkable advantages of the Toro-Tran, write for our two free booklets: "The Torodyne Circuit" and "The Most Interesting Radio Frequency Transformer Ever Invented."

Toro-Trans are ready to mount in any tuned radio frequency circuit. Replace your ordinary coils with Toro-Trans. You will be astonished with the results. Most .00035 mfd. variable condensers will tune them, but by using Cardwell Condensers you get maximum efficiency.

Order from your dealer or direct

CARDWELL TORO-TRAN WITH BALANCING POTENTIODON	$ 4.00
Cardwell .00035 Condenser for tuning	4.75
Cardwell .00035 Vernier Condenser	6.25
Cardwell .00035 Dual Condenser (two-in-one)	8.00
Cardwell .00035 Triple Condenser (three-in-one)	12.00
Cardwell Audio-Trans (compound audio transformers)	10.00

The Allen D. Cardwell Manufacturing Corp.
81 Prospect Street, Brooklyn, N. Y.



K I C - O—the permanent power plant for your radio

If you are tired of buying new batteries every little while—if the stations are not coming in as loudly and clearly as you think they should—if you want better reception at lower cost—if you want a real permanent power plant that will last for years—then buy a KIC-O.

These new KIC-O Nickel zinc alkaline storage "B" Batteries are the product of years of research. They are not harmed by standing idle or overcharging. They give a slow, even discharge over a long period of time and by using the KIC-O Double Potential Charger which can be attached to any electric light socket, you have a permanent power plant.

Write for full description which will tell why KIC-O units are better than dry cells, "B" eliminators and acid "B" batteries.

PRICES

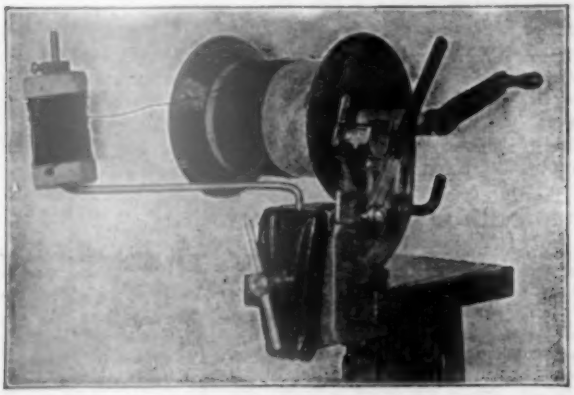
PZ indicates panel type with switches.
CZ is plain type without switches.

Voltage	M.A.H	Type PZ	Type CZ
130	2500	$36.00	$33.00
100	2500	27.50	24.50
70	2500	21.50	18.50
45	2500	16.00	14.50
22½	2500		7.50

Multi-Power Units
(No recharger required)
130 volts $43.50
100 " 35.00

KIC-O Chargers
Type K-1 Single Unmounted $1.50
Type K-2 Single Mounted 3.50
Type K-3 Multi-Polar Mounted .. 5.00
KIC-O Special Charger Chemicals (one cell) ..... .50

KIMLEY ELECTRIC COMPANY, Inc., 2666 Main St., Buffalo, N.Y.



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Clamps on Edge of Bench or Table

USED FOR:

Winding { Plain Tube Coils. / Spiderwebs (on forms.) / Rotors, etc.

Cutting wire.
Looping or bending bus wire.
Has vise, handy for many uses.
Can be supplied with counter to register number of turns wound if desired.

Price $6.00 each, Counter $2.25 extra.

Dealers: Write for our proposition

Specialty Automatic Machine Co.
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We also manufacture Automatic Machinery

You can depend upon them to remain accurate at all times
Made of high resistance material impregnated throughout (not coated paper). Unaffected by climatic conditions. Will not deteriorate. Clamped between solid knurled ferrules assuring rigid construction and firm contact at all times.
At your dealer's, otherwise send purchase price and you will be supplied postpaid.
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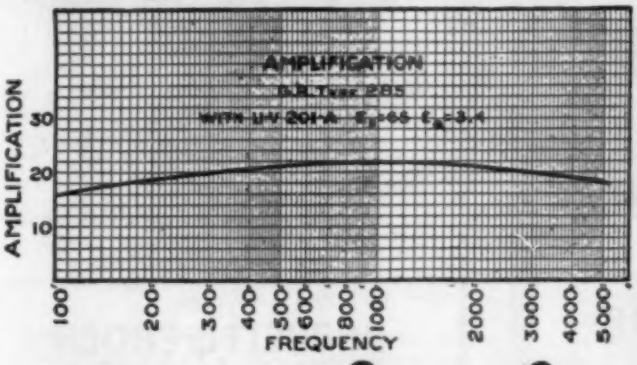
SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

The Outstanding Features of the Outstanding Transformer

Amplification Curve of the Type 285 Audio Transformer



The NEW GENERAL RADIO Type 285 Audio Transformer

Price $7

Higher Amplification over the entire Audio Range.

THE marked superiority of the Type 285 Transformer is evident by its high and uniform amplification over the entire audio range. High amplification is attained by a turns ratio of 6:1. Ordinarily such a high ratio would lower the primary impedance and distort the lower notes, while the higher notes would be muffled or lost entirely by the effect of distributed capacity.

To offset these tendencies the core of the Type 285 Transformer is made of specially selected steel of high permeability, and the turns of the primary and secondary coils are increased to give a higher impedance and turns ratio. Consequently both ends of the curve are sustained, so that greater volume with better tone quality is the result.

More Natural Reproduction of Speech and Music.

TONES of high and low pitch, whether instrumental or vocal, in combination or individually, are reproduced with a clarity that pleases the most critical radio listener.

So great is the amplification produced by the Type 285 Transformer that one stage using a Type 285 gives a volume that is approximately equivalent to that produced by two stages using any average transformers. Seldom is more than one Type 285 necessary to produce good loud-speaker volume with a quality of tone never before realized in radio reception.

If you want the best there is in transformer design, the General Radio Type 285 should be your choice.

For Sale at all Leading Radio Stores

GENERAL RADIO CO.

Cambridge, Mass.

Tone Beauty

Comes Through

Engineering

A transformer which can be fully appreciated only by the designing engineer—combining as it does an extremely high primary inductance with such low internal capacitance of the secondary winding that a 3 to 1 ratio sacrifices nothing. Together with the elimination of the usual short-circuiting turn formed by the case, these features make Rauland-Lyric at once the outstanding engineering development among the fine audio transformers of all time.

There is romance in the story of Rauland-Lyric. A request will bring it to you complete—from the original laboratory studies to the auditions with world-famous music critics. Rauland Manufacturing Company, 2642 Coyne St., Chicago.

The price is nine dollars

Rauland-Lyric
AN
ALL-AMERICAN
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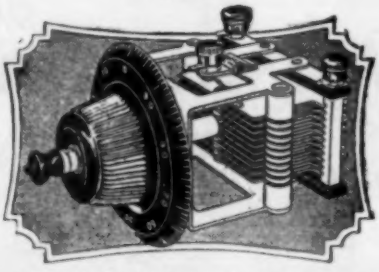
TRANSFORMER

The Choice of Noted Music Critics

THE CAPACITY CURVE SHOULD DECIDE YOUR CHOICE



The whole story of a variable condenser is told by its capacity curve. Low minimum capacity means nothing if the minimum is not usable.
The capacity line of the B & P .0005 variable condenser is straight as a ruler from min. to max. This means that the entire tuning range of *this* condenser is *absolutely* usable.
Only the B & P can give you this advantage and only the B & P can give you the added advantage of true micrometer adjustment.

Max. .0005 — Min. .000008

$6.00 at your dealers or direct. Also .00035 Max. and .00025 Max. Same price.

BARRETT & PADEN
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DEALERS! Write for name of nearest jobber.

Your Set Needs This Glass Socket!

The new Duray Glass Socket is made of Viralon, the most efficient "low-loss" insulation available to radio science. And through the Ezyklean Contacts, corrosion, the enemy of perfect contact is automatically eliminated.

Replace your present sockets with Durays. You'll soon realize the difference they make in the character and volume of current delivered. Price $1.25. Fully guaranteed.

Ask your Dealer—Write for Folder.

DURAY RADIO CORP., Dept. 21, Newark, N. J.

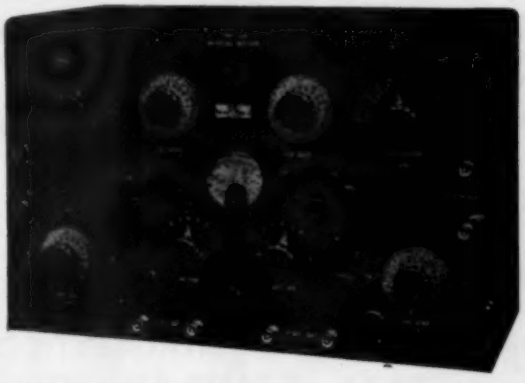
DURAY
ALL-GLASS SOCKET

LAST CALL—ACT NOW!

Kennedy Universal Receiver Type 110 **$94.00**

—

Amplifier only, 2-Stage, Type 521 . . **$16.50**



This amplifier, which is electrically the same as our Type 525, but built into a smaller cabinet, is recommended for use in connection with the Universal Receiver illustrated.

No more Type 525 Amplifiers are available, our stock having been completely disposed of.

This receiver was the foundation of the Kennedy fame as builders of fine radio instruments. Universities and radio engineers pronounced it the first efficient-at-all-wave-lengths receiver. It created a sensation among radio men. No finer receiver has ever been built. In all likelihood it would continue to sell for many years, but we need all our manufacturing facilities for B. C. L. sets. So we are closing out the few remaining Universal Receivers at an amazingly low price.

No more Universal Receivers will be built. When the few remaining sets are sold, the opportunity will be gone. This is not a cheaper edition made for selling purposes—it is exactly the same set that many of the country's best technical men buy for their own use.

With this set you can receive the European high-wave-length stations, direct-from-Arlington time signals, and all the interesting transmission that is beyond the reach of other sets. Then you can drop down to amateur wave-lengths, or tune in on B. C. stations—all on the same set. It is thoroughly efficient all the way up to 25,000 meters.

These prices are lower than the cost of manufacture:

Receiver only, Type 110, was $285.00—now	**$94.00**
Amplifier only, 2-stage, Type 521, was $55—now	**$16.50**
Receiver and Amplifier, was $340.00—now	**$110.50**

Act promptly—this offer will be withdrawn as soon as these few sets are sold. Send your order direct with 10% remittance, balance C. O. D.

The Colin B. Kennedy Company

6400 Plymouth Avenue

Saint Louis

Write for a circular if you want more information

KENNEDY

The Royalty K *of Radio*

If it's an instrument--get a Weston

That's what the leading amateurs say—you'll never go wrong if you stick to Weston instruments. They are a real investment.

Every good transmitting set should have a good antennae ammeter. The Weston Thermo Ammeter eliminates all troubles encountered in the "hot wire" expansion types—has no zero shift and is thoroughly compensated against changes in temperature. It is the adopted standard in commercial and Government radio work. Flange diameter 3¼ in. Get one.

Manufacturers of standard radio tubes explicitly state that an increase of 5% in filament voltage—less than .2 of a volt—shortens the life of the tube by 30% to 50%. Why try to guess? Buy a Weston Filament Voltmeter.

Model 425
Thermo-Ammeter

Weston Instant Change Plug

When it comes to a plug—don't take a substitute. Insist on a Weston. You'll get the best results that are possible from your set. Also write for circular J.

WESTON ELECTRICAL INSTRUMENT CORP., 158 Weston Ave., Newark, N.J

STANDARD THE WORLD OVER

WESTON

Pioneers since 1888

Morse Handy Radio
Set No. 3
Morse for Quality & Service
MACHINE SCREW TAPS
4 6 8 10 12 14
STRAIGHT SHANK DRILLS
10 16 20 29 36 45
MORSE
like these tools, don't forget that
ake larger Taps and Drills, also
amers, Chucks, Arbors, Gauges,
erbores, Milling Cutters, etc.
SE MEANS THE BEST

If you desire a more complete assortment ask for our No. 4 Radio Set. This Set will simplify your radio panel construction. 1 Straight shank drill each No. 10, 16, 20, 29, 36, and 45. 1 Plug Tap and Round Die each 4-36, 6-32, 8-32, 10-32, 12-24 and 14-20. 1 Die Stock No. 22 and 1 Tap Wrench No. 0.

Every man who likes to build things should own this Set.

Send for our folder No. 3-A.

MORSE
TWIST DRILL & MACHINE CO.
NEW BEDFORD, MASS. U.S.A.

GOOD NEWS!

"Radio Telephony for Amateurs" Now Available

In response to tremendous demand, we have reprinted Stuart Ballantine's "Radio Telephony for Amateurs."

This standard and invaluable work for transmitting amateurs and experimenters can be had postpaid for $2.00, from QST Book Department or direct from the publishers.

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Grid Leaks

Used by Eagle, Howard, Thompson, Zenith and others. Fit all sets. Sold on guarantee.

50c *Metallized* Fixed Leaks 18 sizes; under ¼ meg., 75c; over ¼ meg., 50c.

Glass Sealed Variable Leaks 3 sizes fit all sets; 75c each for 1/10, 5 and 10 megs. **75c**

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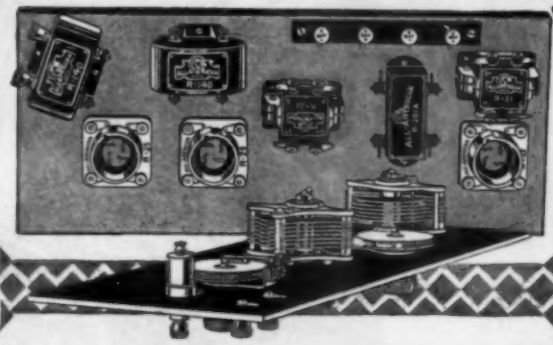
Now Within Your Reach

MEMBER RMA

This is Not a Kit!

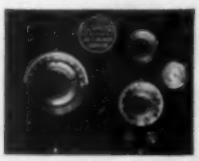


Semi-Finished—Factory-Mounted

YOU buy this set with the ALL-AMERICAN parts properly mounted on the panel and baseboard. Without knowledge of blueprints, circuits or names of radio parts, you can wire up an ALL-AMAX SENIOR in *one delightful evening* and *know* that it is *right*. This completely mounted highly efficient three-tube set costs you no more than you would pay for a kit of parts. Price, $42.

Ten cents will bring you the new Radio Key Book, and upon request we will include, free, a complete wiring blueprint of either ALL-AMAX SENIOR or ALL-AMAX JUNIOR.

ALL-AMERICAN RADIO CORP.
E. N. Rauland, *President*
2642 Coyne Street, Chicago



ALL-AMAX JUNIOR
A one-tube set that brings in the local stations on the loud speaker, or tunes them out and gets real distance. All parts are mounted on panel and baseboard, and clear *photographic* wiring directions are included. Price . . . $22

WIN
AN ALL-AMAX RECEIVER
At your favorite Radio Store

Ask them about the great ALL-AMERICAN Slogan Contest

You can win a set by submitting a SLOGAN

Everybody can enter. It costs nothing

ALL-AMERICAN

"I selected it for its high insulating qualities

It cuts down the losses in the circuit"

THOSE were the exact words of a prize-winner in a radio set-building prize contest, when asked why he used a Radion Panel. Like thousands of others, he had found by experience that there is nothing quite like Radion for real results.

Our engineers developed Radion Panels especially to order for radio. Losses from surface leakage and dielectric absorption are exceptionally low. And low losses mean clearer reception, more volume and more distance.

Radion is easy to cut, drill and saw. You need not have the slightest fear of chipping. It resists warping. It's strong. It's moisture proof. Comes in eighteen stock sizes and two kinds, black and mahoganite.

Radio dealers have the exact size you want. The use of Radion by the manufacturer of ready-built sets is almost invariably a sign of general good quality in that set.

Send for booklet, "Building Your Own Set"

Our new booklet, "Building Your Own Set", giving wiring diagrams, front and rear views, showing new set with slanting panel, sets with the new Radion built-in horn, lists of parts and directions for building the most popular circuits—mailed for ten cents.

AMERICAN HARD RUBBER COMPANY
Dept. L4, 11 Mercer St., New York City.
Chicago Office: Conway Building
Pacific Coast Agent: Goodyear Rubber Co., San Francisco—Portland

RADION

The Supreme Insulation

PANELS

Dials, Sockets, Binding Post Panels, etc.

American Hard Rubber Company,
Dept. L4, 11 Mercer St., New York City

Please send me your new booklet, "Building Your Own Set" for which I enclose 10 cents (stamps or coin).

Name _____

Address _____

City _____ *State* _____

Apex Super 5

This highly efficient tuned radio frequency receiver is the most advanced in design and construction. It is an instrument that meets every critical expectation of the seasoned radio enthusiast.

Buy the Apex Super 5. You will have a radio receiver that brings in distant stations clear and distinct. Select the station you desire in your log-book, turn the marvelous Apex Vernier Dials to that number, and there you are—perfect reception. No greater selectivity can be had than is easily obtained with the Apex Super Five.

Housed in a highly finished walnut cabinet, complete with Jones Multi-plug Battery Cable. All settings highly gold plated. Sells for $95 complete excepting accessories.

At All Good Dealers

Apex Elec. Mfg. Co.
1410 W. 59th St.
Dept. 409
Chicago

on the dot

Premier
"LO LOSS" TUBE SOCKET
Price 90 cents

CONSERVE YOUR CURRENT

Write for free bulletin No. 94, describing this radically different tube socket. Lowest insulation leakage, lowest capacity. Contacts always visible. Contact springs automatically clean tube prongs. New cam-action tube lock makes insertion of tubes easy and contact certain. "Hook-up" diagrams free on request.

PREMIER ELECTRIC COMPANY, 3811 Ravenswood Ave. CHICAGO

PREMIER *Quality Radio Parts*

SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

amateur transmitting condenser

For amateur transmitting stations—the Dubilier Condenser No. 668. It may be used as a series antenna condenser; a plate blocking condenser or a grid coupling condenser in tube transmitters of 500 watts or lower.

Capacity .0001 to .075 Mfd. operating voltage 1000 to 3000 volts continuous at a current of 5 amperes—radio frequency of 750 to 1000 kilocycles.

Dubilier

CONDENSER AND RADIO CORPORATION

PRECISE INSTRUMENTS

GIVE BEST RESULTS—THEY HAVE NO EQUAL

Laboratory Instruments at Commercial Prices

Precise Super-Multiformer No. 1700

The one great advancement that has been made in Superheterodyne design since the original conception of the circuit. 1 instrument that does the work of 4—replacing all long-wave transformers. Like all other PRECISE instruments, this Super-Multiformer is made in strict accordance with the specifications of our Research Engineer, J. L. McLaughlin. This, plus PRECISE standards of skill and workmanship is your guarantee of best results. $10.

Precise Audio Transformer No. 285

In performance this is the most amazing transformer on the market today. The first choice of radio experts everywhere. There is no other like it for volume and perfect reproduction. $5.00.

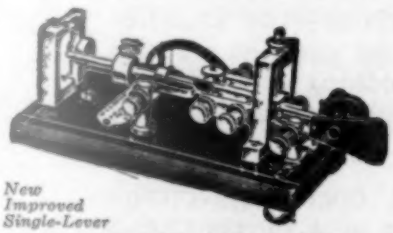
Sold by the better dealers

Precise Manufacturing Corporation, Rochester, New York

Branches—53 W. Jackson Blvd., Chicago and 821 Market St., San Francisco
Eastern Sales Office—Niagara Sales Corp., 3-5 Waverly Place, New York City
Southern Representative—Saal Products Sales, Inc., 35 Warren Street, New York City
Canadian Distributors—Perkins Electric, Ltd. - Toronto - Montreal - Winnipeg

Martin's New and Improved VIBROPLEX

Reg. Trade Marks Vibroplex Bug Lightning Bug



New Improved Single-Lever

Japanned Base, $17 Nickel-Plated, $19

Transmits perfect signals at any desired speed. Easy to learn and operate. Saves the arm. Used and recommended by more than 85,000 wireless and commercial operators.

Special Large Contacted Vibroplex

Equipped with 3-16 inch contact points to break high current without use of relay ....$25.

Sent on receipt of price

THE VIBROPLEX CO. Inc.

825 Broadway, New York *Established 1890*
Brooklyn: 796 Fulton St.

HERCULES Aerial Mast

20 Ft. Mast $10
40 Ft. Mast $25
60 Ft. Mast $45

All steel construction. Complete with guy wires and mast-head pulley. We pay freight.

S. W. HULL & CO., Dept. C5
2048 E. 79th St. Cleveland, O.

Write for Literature and FREE Blueprint

Best for Reflex

and Crystal Sets

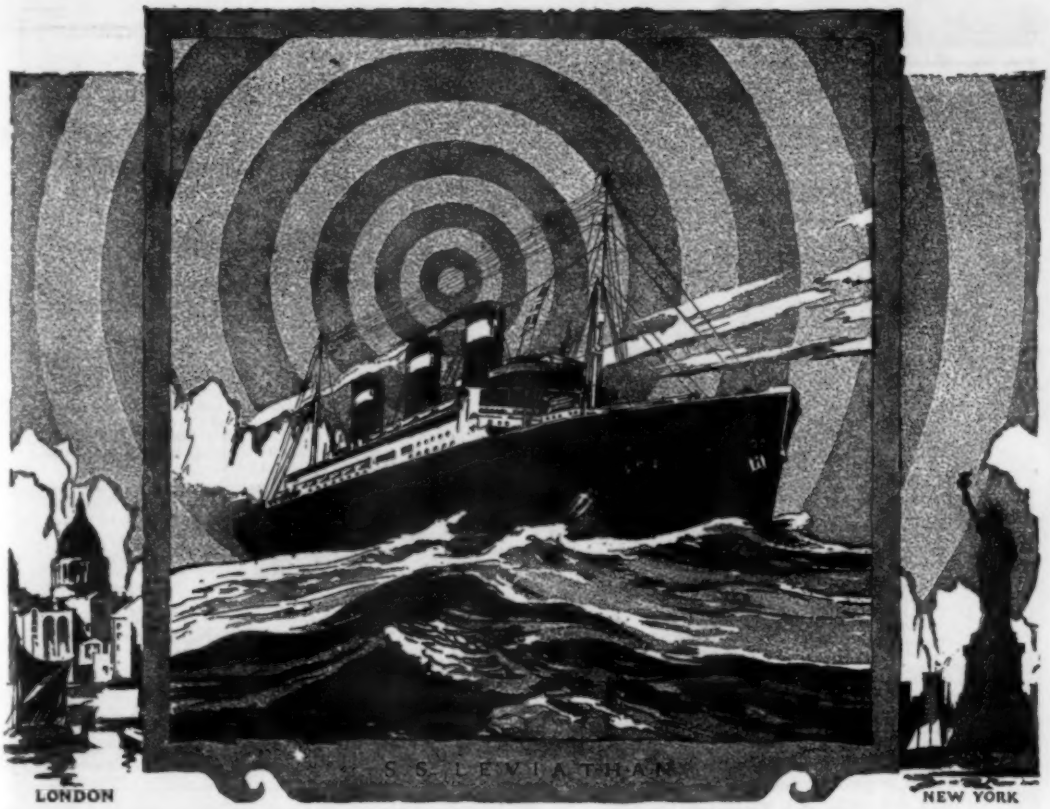
FRESHMAN

Double Adjustable Crystal Detector

No more searching for the sensitive spot. Merely turn the knob as you would a dial. *For base or panel mounting complete with Freshman Super-Crystal* **$1.50**

At your dealer's, otherwise send purchase price and you will be supplied postpaid.

CHAS. FRESHMAN CO. Inc., Freshman Bldg.
240-248 W 40 St., New York



In touch with two continents from mid-ocean

THE world's biggest ship carries the world's greatest steamship radio. In crossing the Atlantic the Leviathan is never out of touch with Europe and America. Even if her main radio set should fail, there is an emergency radio always ready for any crisis. In these vital radio installations Exide Batteries are used because of their dependable power.

Exide Radio Batteries went to the Arctic on MacMillan's snug little ship Bowdoin. Exides were with the round-the-world fliers and on the Navy airship Shenandoah. They are being used in the new radio photography. Exide Batteries are on duty in government and commercial radio stations all over America.

The new Exide "B" Battery with glass cells, 24 and 48 volts, 6000 milliampere hour capacity.

In your home set

The Exides made for your home receiving set are built with the same care and have the same characteristics that make them trusted where life is at stake.

There is an Exide type for every tube and a size for every set. They give uniform current through a long period of discharge. You are assured the clearest reception.

At radio dealers and Exide Service Stations you will find Exide "A" Batteries for 2-volt, 4-volt, 6-volt tubes, and glass cell "B" Batteries, 24 and 48 volt, of 6000 milliampere hour capacity. All these batteries are conservatively rated, rugged, long-lived, and right in price.

Ask for Exide Radio Batteries by name and get them from your dealer or Exide Service Stations.

THE ELECTRIC STORAGE BATTERY COMPANY
PHILADELPHIA
Exide Batteries of Canada, Limited
153 Dufferin Street, Toronto

Exide
RADIO BATTERIES

FOR BETTER RADIO RECEPTION USE STORAGE BATTERIES

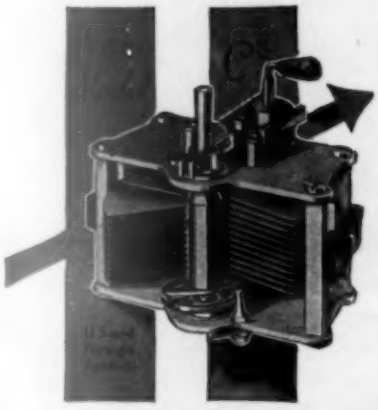
For Better Radio

Hammarlund

PRECISION

CONDENSER

Copyright March 17, 1925



THE more you know about the technical requirements of radio, the more you appreciate the technical refinements of the Hammarlund New Model "C" Condenser.

It is an instrument of laboratory precision sold at a popular price by the better radio dealers. All capacities; plain and vernier.

Use Hammarlund Condensers in the receiver you build. Look for Hammarlund Condensers in the receiver you buy.

HAMMARLUND MANUFACTURING CO.
424-438 West 33rd Street, New York

9 points of superiority

1—Soldered brass plates, chemically treated against corrosion; perfect alignment.

2—Stator plates specially shaped for easy tuning of low waves.

3—Adjustable ball-bearing rotor shaft, grounded through metal end-plates.

4—Soldered clock-spring pigtail, with automatic stop.

5—Minimum dielectric; losses too small to be measured.

6—Rugged, compact construction; cannot warp.

7—Micrometer cam-vernier moves all plates; knob or lever control; no backlash.

8—Takes any size dial.

9—The product of 14 years' experience, making precision instruments.

Have you looked here for the trouble?

Does your radio set howl? Is there a lack of volume? Or do "frying" sounds form a background to your otherwise clear reception?

Such troubles, in a majority of cases, are due to faulty jack equipment. No matter how good the other parts in your set their efficiency will be wasted by the use of poorly made, leaky jacks.

"Use good jacks" is one of the first principles of successful set building. And there is great significance in the fact that over twenty-five of the leading set manufacturers have chosen Pacent in preference to all others.

You, too, can have Pacent Jacks in your set—for your dealer carries them or can get them for you quickly. The ten different models are priced at 50c to 90c.

Our catalog describes Pacent Jacks —and over twenty other radio parts and accessories. Write for a copy.

PACENT ELECTRIC COMPANY, Inc.
91 Seventh Avenue, New York City

Chicago
Washington
San Francisco
Philadelphia
Jacksonville
Minneapolis
Pacent
RADIO ESSENTIALS
St. Louis
Boston
Birmingham
Buffalo
Detroit

"DONT IMPROVISE — PACENTIZE"

THE NEW CROSLEY 51-SPECIAL

$23.50

Of Course, the Famous Crosley 51 Regular at $18.50 Will be Continued

Here is the popular Crosley 51 dressed up in new clothes. It is known as the Crosley 51-Special. This two tube, genuine Armstrong regenerative receiver is exactly the same as the nationally known Crosley 51, except it is installed in a larger cabinet in which there is room for dry cell batteries. Also there is the slanting panel, a feature that adds to the appearance of the set and makes operation more comfortable. All Crosley radios are licensed under Armstrong Regenerative U. S. Pat. 1,113,149. Other models priced from one tube 50, at $14.50 to the Trirdyn Special with sloping panel, at $65. Prices quoted without accessories. West of Rockies add 10%. For sale by good dealers everywhere. Write for catalog.

THE CROSLEY RADIO CORPORATION
Powel Crosley, Jr., President
418 Sassafras Street Cincinnati, Ohio
Crosley Owns And Operates Broadcasting Station WLW

Stromberg-Carlson
No. 2-A
LOUD SPEAKER
$17.50
With 5-ft. Cord and Plug

Sweet-Toned As a Chime of Bells

It is the exquisite quality of tone—the clear, lifelike reproduction of either music, or speech, that charms everyone who hears a Stromberg-Carlson No. 2-A Loud Speaker. Programs from either distant or nearby stations come in on this Loud Speaker with a volume which fills the room.

The extraordinary sensitiveness of these instruments, their full volume, and their fine tone quality are possible only on account of the *Powerful Magnets* and the *Powerful Coils* used in their construction. The magnets show, in laboratory tests, an actual "pick-up" of 2½ lbs. The coils are *Layer Wound* and *Layer Insulated*—a construction which ensures that they will stand up under the highest plate voltages.

Ask your Dealer

Stromberg-Carlson Telephone Manufacturing Co.

1060 University Ave. Rochester, N.Y.

The new Stromberg-Carlson No. 3-A Head Set. Light—comfortable—handy. **Powerful Magnets**, combined with **Layer Wound** and **Layer Insulated Coils** give extreme and lasting sensitivity.

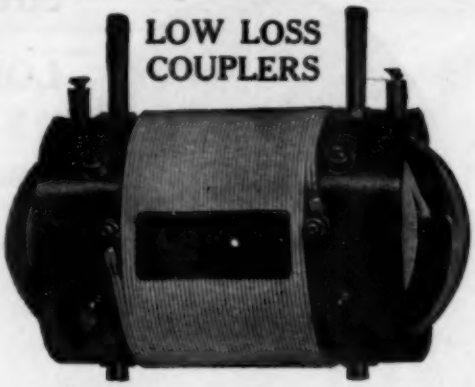
Price $5.50 including 5-foot cord.

Stromberg-Carlson

175 to 600 METERS

No. 3 P. S. T. BROADCAST COUPLER

$6.75



LOW LOSS COUPLERS

50 to 150
70 to 200
METERS

HAM SPECIAL SHORTWAVE COUPLERS

$6.00

This original two rotor coupler, on market for three years.

With a *wave trap* tunes as sharp as a superhet. For selectivity far superior to a five tube set with two stages R.F.

This coupler consists of a single unit in which is contained a *"low loss"* Stator or secondary winding and two rotors, one of which is the antenna inductance and wound with *"low loss"* coarse wire.

The coupler is strongly recommended for use in *congested districts* where interference is bad.

At your dealers or sent C. O. D.
Send for "Carco" Catalog

DESIGNED BY A HAM FOR HAMS

Government specifications for short wave low loss tuner are No. 10 D.C.C. wire wound single layer.

The "CARCO" Ham Special using two No. 18 D.C.C. wires in parallel (equal to a No. 12) is the nearest approach to these specifications of any on the market. A compact unit in a space of only 3" x 5½".

Antenna Rotor and secondary Stator designed for "Low Loss" and "Low Resistance."

Our special single layer, *multiple wound* inductance does the trick. Low loss tubing used.

THE CARTER MANUFACTURING CO.
1728 Colt Ave., East Cleveland, O., U. S. A.

The EAGLET

3 Tube Dry Cell

NEUTRODYNE

$75

The World's Greatest Popular Priced Set

Manufactured and Guaranteed by
EAGLE RADIO COMPANY
Makers of
The Famous Models A and B
EAGLE NEUTRODYNE RECEIVERS

Your protection for quality and unparalleled
VALUE

Ask the Dealer—He Knows

EAGLE RADIO COMPANY
22 Boyden Place Newark, N. J.

The DAVEN
RESISTANCE COUPLED
AMPLIFIER KIT

The Aim of Radio is distortionless reproduction — the

DAVEN RESISTANCE COUPLED AMPLIFIER

hits the mark! Three or four stage kits bring its perfection to those "who build their own."

Buy from your Dealer the "RESISTOR MANUAL," our complete handbook on Resistance Coupled Amplification. Price 25c, Postpaid 35c.

DAVEN RADIO CORP.
"Resistor Specialists"
Newark, New Jersey

Music Master Success

Music Master
Resonant Wood Insures Natural Tone Quality

Model VI, 14" wood bell $30

Model VII, 21" wood bell $35

Connect Music Master in place of headphones. No batteries. No adjustments.

Prices of all models slightly higher in Canada

Model VIII, Mahogany Cabinet with "full-floating" wood bell $35

Model V, wood bell, Metal Cabinet, Mahogany finish . $18

—*Its True Significance*

THE advent of Music Master sounded the death knell of the mere "loud speaker", transformed the radio receiving set into a musical instrument and made possible the wonderful stellar program now the feature of nation-wide broadcasting.

Music Master does more than reproduce—it interprets, it re-creates. Imitated but never equaled, it remains the *supreme musical instrument of radio*—and there IS no substitute.

MUSIC MASTER—the Ultimate of Artistic Radio Re-Creation

Music Master's precision instrument is the acme of scientific perfection. Music Master's tone chamber of heavy cast aluminum is a marvelous mold of sound without distortion. Music Master's amplifying bell of resonant wood gives to every sound its full, vibrant qualities and natural characteristics.

Music Master's manufacturers pledge unreserved and unconditional protection to every purchaser. Back of your dealer stands the Music Master Corporation to guarantee its products *direct* to anyone, anywhere, at any time.

Music Master Corporation

Makers and Distributors of High-Grade Radio Apparatus
Tenth and Cherry Streets
Chicago Philadelphia Pittsburgh
Canadian Factory: Kitchener, Ontario

Magic Radio Clearness

With this new principle born—the Kellogg Symphony Reproducer

Brings in the marvels of the air exactly as broadcast.

Embodies a new principle—the result of years of experiment by our experts.

Made by the 28-year old Kellogg Switchboard & Supply Company—specialists in the transmission of sound.

Improves any set it's used on.

Hear It Today

Today, hear the Kellogg Symphony. Do not buy any lesser horn until you have heard it. It will increase the value of your set 100% in musical quality—in pleasure to your family and yourself. Any dealer will gladly demonstrate the Symphony for you. Hear it—today!

Kellogg Switchboard & Supply Co.

CHICAGO ILLINOIS

KELLOGG
Symphony
Reproducer

FINDLAY

Stand-Off Insulators

"For Perfect Reception"

No. 1928

Designed especially for radio purposes. Will hold lead-in wire six inches from building. Corrugated so that it will drain quickly. Will not deteriorate. Made entirely of porcelain, the dependable insulation. Easy to install. Packed in cartons with padded screws ready for installation.

Price, 50c

ON SALE at all leading radio stores. Mail orders accepted at factory when accompanied by cash or money orders.

All types of porcelain radio insulators and insulated screw hooks. Send for circular.

MANUFACTURED BY

The Findlay Electric Porcelain Co.

FINDLAY, OHIO

Globe Low-Loss Tuners

Make the Perfect Radio Set

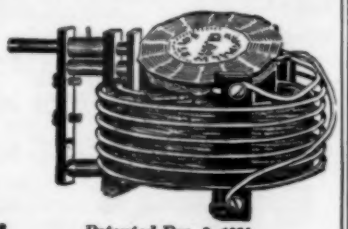
QUALITY—VOLUME—DISTANCE

No Metal
No Eddy Current Losses

Little Insulation
Low Distributed Capacity

Large Wire
Self Supporting

Anti-Capacity Windings
Low R F Resistance



Patented Dec. 9, 1924

GET ORIGINAL GLOBE COILS

PRICES:

Standard Tuner (Broadcast Range)	$7.00
Short Wave (35-135 Meters)	$7.00
For Superdyne Circuit	$8.50
R F Transformers	$6.00

Circular on Request. Dealers and Jobbers Write.

Globe Radio Equipment Co.

217 West 125th St., N. Y.

NATIONAL DIALS

Radio experts as well as thousands of delighted users praise NATIONAL Dials for their velvety smoothness and for precise tuning.

NATIONALS are the dials with the

"Perfect Radio Touch"

PRICES—4", $2.50; 3 3/8" $2.25

NATIONAL COMPANY, Inc.

110 Brookline St., Cambridge, Mass.

Sole Licensees for the Manufacture of the National Regenaformer under the Browning-Drake patents.

ROICE

Radio Tubes

The Royalty of Radio Tubes. A powerful and durable tube that will greatly improve reception, increase range and volume with a maximum of clearness. Our direct sales plan enables you to buy "Roice" at the lowest possible price.

Type 200—5 Volts, 1 Ampere Detector Tube.
Type 201-A—5 Volts, .25 Ampere Amplifier and Detector.
Type 199—3-4 Volts, .06 Ampere Amplifier and Detector.
Type 199A—3-4 Volts, .06 Ampere with Standard Base Amplifier and Detector.
Type 12—1½ Volts, .25 Ampere Platinum Filament Amplifier and Detector.
Type 202—5 Watt Transmitter $3.00.

Shipped Parcel Post C. O. D.

All Standard Types $2.00.

All Tubes Guaranteed

to work in Radio Frequency, especially adapted for Neutrodyne, Reflex and Super-Heterodyne Sets.

When ordering mention type.

ROICE TUBE CO.

21 Norwood St., Dept. S Newark, N. J.

THE WC-12
Console

"Average Reception"

That's What Counts

It's the way distant stations come in on "average nights"—yes, even on "bad nights" that determines the value of the set you buy. It's *not* its performance on *ideal* nights.

The Radiodyne surprises even the expert with its amazing selectivity—its exceptional tone clarity and unusual volume. The Radiodyne is not a prima donna that suffers from temperament.

A Few

RADIODYNE

Type WC-12 Features

Tunes Sharply Thru Local Stations
Uses 6 Dry Cell Tubes
Receives from Great Distances
Has Wonderful Volume
Exceptional Clarity
Batteries self contained in beautiful two-toned Mahogany Cabinet

Models Priced from $65 to $250

Everyone a Radiodyne **Everyone Worth the Money**

Write for Booklet

WESTERN COIL and ELECTRICAL CO.

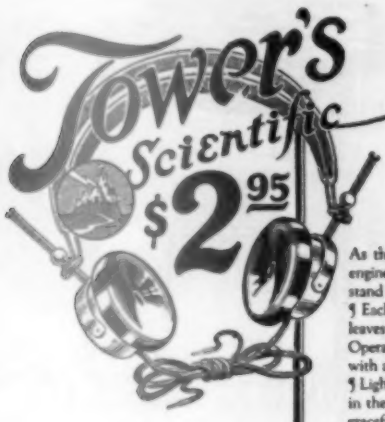
305 Fifth Street, Racine, Wisconsin

If you can get it with any set you can get it Better with the

de Forest Radiodyne

The Greatest Name in Radio

"The Voice of the Nation"



MILLIONS are enjoying music and entertainment reproduced in clear, mellow tones, characteristic of TOWER'S Scientifics.

Two Towers

As the Eiffel Tower stands as a monument to skilled engineering construction so TOWER'S Scientific phones stand as a monument to supreme radio achievement.

¶ Each phone is carefully tested and approved before it leaves the factory by a Government Licensed Radio Operator thus guaranteeing perfection in tone quality with a positive uniformity of volume.

¶ Lightest of all in weight (only 8¼ oz.) they do not catch in the hair and are unusually easy to adjust conforming gracefully to the head.

If your dealer cannot supply you, order direct, we will ship immediately Parcel Post C.O.D.

THE TOWER MFG. CORPORATION
98 BROOKLINE AVE. Dept. G BOSTON, MASS.

One of the seven wonders of the world.—The Eiffel Tower built in 1887-89 on the Champ-de-Mars contains 3 stories. Reached by a series of elevators, the platform at the top being 985 feet above the ground. In the top story is located the powerful Broadcasting Station FL.

The World's Greatest Headset Value

"means right amperes"

The self-adjusting rheostat that automatically controls tube current, eliminates hand rheostats, filament meters, guessing and tube worry. Simplifies wiring. Increases compactness. Doubles tube life. Makes every operator an expert. Tested and approved by all leading laboratories. Used by more than 50 foremost set manufacturers. Be sure the set you build or buy has AMPERITE.

RADIALL COMPANY
Dept. Q.S.T.-4 50 Franklin Street, New York City

You Must Protect Your Radio

The National Board of Fire Underwriters *insists* that an approved arrester be used on all radio aerials.

Your natural choice is the Brach Vacuum Arrester which has had the confidence of America's leading electrical engineers for 19 years.

Millions In Use Throughout the World

Safety demands the
BRACH VACUUM ARRESTER

L. S. BRACH MFG. CO. — BRACH — NEWARK NEW JERSEY

NAA
METER TESTED RADIO CRYSTALS

Full, clear rectification insured by newly developed visible laboratory meter-testing. Perfect for radios. Price 60c at your dealer or direct.

The Newman-Stern Co
1750 East 12th Street Cleveland, Ohio

We Have the "Hard to Get" Things!
For Your Transmitter

AMRAD "S" TUBES

Plenty of "S" Tubes in Stock for Immediate Delivery . . . .
TYPE 5000-1 . . $6.50
TYPE 4000-1 . $10.00

WESTERN ELECTRIC and RADIO CORP. TRANSMITTING TUBES
IN ALL SIZES—PRICES ON APPLICATION

V. T. 1 and V. T. 2 $6.00 each
JEWELL METERS | WESTON METERS
WESTINGHOUSE DYNAMOTORS
Large Bakelite Panels | R.C.A. Inductances
PYREX INSULATORS—All Sizes
R. C. A. and Acme Plate and Filament Transformers
Cardwell Transmitting Condensers
General Radio Wave Meter Coils for Short Waves

Write us for Price List and Information Blank

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TOAZ GRIPFAST TERMINALUGS
Patent Applied For
NOW READY FOR DELIVERY
COPPER — TINNED — $3.00 M
AMATEURS!

60 Plain Type Lugs $0.25
50 Gripfast Lugs .25
25 Dubbielugs, (1 9-16 centers) .25
12 feet Bus Wire .25
Any combination—5 items $1 Pp.
Discounts to Dealers
Free Pamphlet Practical Soldering

TOAZ Engineering and Sales Co.
11703 Robertson Ave., Cleveland, Ohio

PATENTS Secured
Radio Inventions a Specialty Trade Marks Registered
Mason, Fenwick & Lawrence
Patent and Trade Mark Lawyers
Washington, D. C., New York, Chicago
Established over 60 years *Write us*

References: National Confectioners' Association, Chicago; National Canners' Association, Washington, D. C.; Life Savers, Inc., Port Chester, N. Y.; Bon Ami Co., U. S. Cigar Co., New York City; Hershey Chocolate Co., Hershey, Pa.; Stephen F. Whitman & Son, Philadelphia, Pa., and many others.

BESTONE RADIO TUBES
FOR
QUALITY, VOLUME and DISTANCE
200 201A **$1.50** 199 12
STANDARD 199 BASE

Save Money, buy direct. Every Tube is guaranteed. Mail orders and C. O. D.
Discount to dealers.
All orders filled same day as received.

BRYANT RADIO TUBE COMPANY
453 Washington Street, Boston, Mass.

A. R. R. L. Members -- What about your friends?

You must have a friend or two who ought to be members of our A.R.R.L., but aren't. Will you give us their names, so that we may write to them and tell them about the League and bring them in with the rest of us? The A.R.R.L. needs every eligible radio enthusiast within its ranks, and you will be doing your part to help bring this about by recommending some friends to us. Many thanks.

.....1925

American Radio Relay League,
Hartford, Conn.

I wish to propose

Mr. ..... of.....

Mr. ..... of.....
Street & No. Place State

for membership in the A.R.R.L. I believe they would make good members. Please tell them the story.

.....

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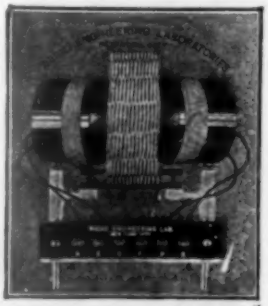

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HAM-ADS

IMPORTANT NOTICE! NEW RATES ADVANCED CLOSING DATE

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Effective with May QST, the HAM-AD Advertising Rates will be TEN CENTS A WORD. Name and address to be counted, each initial counting as one word. These rates are shown on QST Rate Card No. 6, in force with the May issue.

The closing date for HAM-ADS is now THE TWENTY-FIFTH OF THE SECOND MONTH PRECEDING DATE OF ISSUE. For example, all HAM-ADS for the June issue must be in this office not later than April 25.

Hereafter no HAM-AD will be accorded any particular or special position.

Rates for the QRA Section remain the same; 50c straight. See heading of that section for details.

RADIO'S GREATEST CHARM—DISTANCE. FOR REAL DX—ABSOLUTE QUIET. THAT MEANS AN EDISON STORAGE B FOR PLATE SUPPLY (THE 8ML KIND). PURE NICKEL CONNECTORS ELECTRICALLY WELDED TO ELEMENTS INSURES A COMPLETE, JOINTLESS CIRCUIT FROM POSITIVE TO NEGATIVE TERMINALS OF THE BATTERY. NEW SHOP AND EQUIPMENT MAKES POSSIBLE THESE LOWER PRICES. MAKE YOUR SET REACH OUT WITH ONE OF THESE. 54 VOLTS (DX BOOSTER) $8.25. 100 VOLTS (JUST RIGHT SIZE) $15.00. 130 VOLTS $18.75. 150 VOLTS $21.50. FUMED OAK COVERED CABINET WAX FINISH. RUBBER MAT. LARGEST EDISON ELEMENTS ELECTRICALLY WELDED TO PURE SOLID NICKEL CONNECTORS. GENUINE EDISON ELECTROLYTE (THAT'S NO LYE). CAREFULLY PACKED. SINGLE CELLS 15c. HERE'S A WHALE OF A B FOR THAT BIG SET—A 2000 MILIAMP HOUR DOUBLE CAPACITY B IN HEAVY FLAT BOTTOM GLASS JARS. 105 VOLTS $24.00 STATE UNIVERSITY HAS 800 CELLS. SINGLE CELLS 17c PARTS, 19c READY TO WIRE, 24c ASSEMBLED (WELDED) CELLS. 21c WITH NICKEL CONNECTORS WELDED TO ELEMENTS. DISCOUNTS 500 VOLTS UP. YOUR EDISON B WILL WORK—IF MADE FROM 8ML SURE-FIRE PARTS, LARGEST LIVE TYPE A EDISON ELEMENTS 5c. DRILLED 6c. PAIRS WELDED WITH PURE SOLID NICKEL 7½c. G ELEMENTS 3c PAIR. 2 POSITIVE 1 NEGATIVE 4c. HICAP G CELLS 1500 MILIAMP HOUR 15c PARTS. 17c READY TO WIRE. 22c ASSEMBLED (WELDED). INCLUDING EDISON SOLUTION. BOTH G AND A HICAP CELLS GREAT FOR SUPERS, POWER AMPLIFIERS, TRANSMITTERS. FOR THE SUPERHET AND HIPOWER TRANSMITTER A STILL HUSKIER SUPERCELL—3000 MILIAMP HOUR CAPACITY. 27c CELL PARTS. 33c WELDED AND ASSEMBLED. ANNEALED GLASS TEST TUBES INDIVIDUALLY WRAPPED ¾x6" 3c. 1x6" 4c. SHOCK PROOF 1x6" FLATBOTTOMED HEAVY GLASS JARS ⅛" THICK 4c, 1¼x6½" 5c. LIFE INSURANCE POLICY FOR YOUR B. WIRE WITH .032 PURE SOLID SOFT (NOT PLATED OR ALLOY) NICKEL WIRE 1c FT. .034 1¼c FT. PERFORATED HARD RUBBER SEPARATORS ½c EACH. WORK YOUR EDISON ELEMENTS TO FULL CAPACITY. ONLY POSSIBLE WITH CHEMICALLY CORRECT COMBINATION OF LITHIUM AND POTASSIUM—EDISON ELECTROLYTE. $1.25 TO MAKE 5 LBS. SOLUTION. CAN'T RUN THE OLD BUS WITHOUT GAS—NOR THE B EITHER. REALLY CHARGE IT WITH A WILLARD COLLOID RECTIFIER. SMALL 50 VOLT SIZE $2.00—JUMBO $3. 100 VOLT FULL WAVE COLLOID, SMALL $4. LARGE FOR HICAP CELLS $6. CHARGES 100 VOLTS ALL IN ONE BITE. USES BOTH HALVES OF CYCLE. HIVOLTAGE TUNGAR CHARGER INSTRUCTIONS 50c. EVERYTHING FOR THAT EDISON B. FRANK MURPHY—RADIO 8ML, 4837 ROCKWOOD ROAD, CLEVELAND, OHIO.

ATTENTION HAMS. A SURE SOURCE OF SUPPLY ON TRANSMITTING APPARATUS MEANS MUCH TO YOU, WHEN IN NEED OF PARTS. NO WAITS, NO DELAYS. WE SHIP ALL ORDERS THE SAME DAY THEY REACH US. HAVE SOME NEW PARTS THAT YOU WILL SURELY NEED. THE ALLEN-BRADLEY RADIOSTAT CONTROLS THE PRIMARY OF YOUR FILAMENT TRANSFORMER, AND LEAVES THE CENTER TAP, "IN THE CENTER". CAPACITY UP TO 500 WATTS ES THE PRICE IS ONLY $6.50. JUST IN, THE JEWELL RADIATION AMMETER, 0-½ es 0-1 AMPERE AND SELLS FOR 12.00 JUST THE STUFF FOR THAT LOW WAVE SET THAT ONLY WIGGLES UR PRESENT METER. YOU CAN SPLIT A HAIR WITH THE NEW NATIONAL VELVET VERNIER KNOB & DIAL. NO LOST MOTION WHATEVER. IT SELLS FOR 2.50 CHEMICALLY PURE SHEET ALUMINUM .90c PER SQUARE FT. ES SHEET LEAD .75c PER SQUARE FOOT. BOTH OLD STANDBYS AND BEST ON THE MARKET. OBEY THAT IMPULSE, AND GIVE US AN ORDER FOR YOUR NEEDS FOR THAT NEW ANTENNA YOU WANT. NO 12 SOLID COPPER ENAMELLED, (FULL SIZE AND MEASUREMENT) ONLY COSTS YOU 1.00 PER HUNDRED, AND WE PAY POSTAGE TO THE THIRD ZONE. THERE IS NO THING AS "JUST AS GUD" WHEN YOU SPEAK OF ANTENNA WIRE. GET NO. 12 ENAMELED FROM US, AND BE SATISFIED. SAME APPLIES TO THE OHIO BRASS INSULATORS. FIVE AND TEN INCH, SELL FOR .75c es $1.50. SLIP US A LINE OMS, AND LET'S GET ACQUAINTED. WE'RE THE ONLY HAM STORE IN THE 5th DISTRICT. FT. WORTH RADIO SUPPLY CO., 104 EAST TENTH ST., FT. WORTH, TEXAS.

AMRAD No. 2796 LIGHTNING SWITCH mounted on 5½ in. porcelain posts. Lists at $8.00, our price post paid, new $1.50. Write for List. STATE RADIO COMPANY, 286 Columbia Rd., Dorchester, Mass.

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1 Rorn used very little $20.00; 1—CR13 used very little, $45.00; 2—Crosley XJ new each, $35.00; 1—D7A De Forest used very little, $35.00; 1—Crosley 51P new, $20.00; building 100 watts need parts. Will consider trades. No good offer refused for any of above goods. Joseph R. Tate, Harrisburg, Ill.

C. W. Klenk, owner and operator of station 9AAU-ZK wishes to announce that he has turned in 9AAU and is now using his SPECIAL 9ZK exclusively. 9DS as a portable.

For sale: 200 W-1,000 V Esco m. g. in A No. 1 condition. Use thirty days. Also 50 Henry Choke. Will sell very reasonable or trade for other apparatus. Make cash offer or trade, address Radio Department, Finke Furniture Co., 307 S. Seventh St., Evansville, Indiana.

GREBE CR-8, $30.00, absolutely new, positively guaranteed. Never used, perfect condition. Latest model with shipping carton. 8WY

HI Mr. Fan! DON'T LET THIS REAL BUY GET BY —Brand New UV-202 Radiotrons (5 watt tubes) regular price $8.00; MY PRICE $6.00; only post office or express MONEY ORDERS accepted. 8FE, Box 331, Eggertsville, N. Y.

RADIO GENERATORS—500 volt 100 watt, $28.50 Battery Charging Generators $8.50. High Speed Motors, Motor Generator Sets, all sizes. Motor Specialties Co., Crafton, Penna.

ENVELOPES—100 good white envelopes with name and address printed, 50c postpaid. Emblem or call in red $ .25 extra. Guy Sherman, Clinton, Ia.

LO LOSS PRICES—SAMPLE PRICES FROM OUR HAM LIST. 99% PURE ALUMINUM FOR THAT RECTIFIER. PER SQUARE FOOT 85c EXTRA HEAVY CHEMICAL PURE LEAD PER SQUARE FOOT 85c. WHY BOTHER WITH CHEMICAL RECTIFIERS? "S" TUBES NO. 4000-1A $10; SPECIAL TWO PIECE "S" TUBE SOCKET $1.25. BEST LO LOSS SOCKET YET —FLERON DOUBLE CONTACT PORCELAIN SOCKET —SIMILAR TO OLD RCA—EACH 65c. FOR THAT ANTENNA—SOLID ENAMELED NO. 12 COPPER WIRE, PER FOOT 1c; 10 INCH PLATE GLASS INSULATORS 59c; FLERON 4 INCH GLASS INSULATORS 30c; PYREX 8 INCH INSULATORS $1.39. HOW DO YOU EXPECT TO HEAR DX WITH CHEAP FONES? BRANDES SUPERIOR $5.69; BALDWIN TYPE "C" $11.19. SET OF 3 COILS FOR 80 METER MEISSNER TRANSMITTER $2.50; JEWELL TRIO: 0-15 AC VOLTMETERS $6.95; JEWELL 0-500 MILLIAMMETERS $6.95; JEWELL 0-1½ THERMO-COUPLED AMMETER — JUST THE RIGHT RANGE FOR LOW WAVES $11.59. CONSRAD RADIO CALL BOOK—JUST OUT—U. S. AND ALL FOREIGN HAMS WITH BCL STATIONS AND TIME TABLES—NO ADVERTISEMENTS EACH 35c POSTAGE 6c; CARDWELL LO LOSS .00025 CONDENSERS $3.95; UC490 FILTER CONDENSERS $2.35. UP1719 GRIDLEAKS $1.05. BRADLEYRADIOSTAT FOR PRIMARY FILAMENT CONTROL $6.50; ACME POWER RHEOSTAT FOR 5 WATTERS $1.25. ROICE 199A WITH STANDARD BASE $2.00; ROICE 201A $2.00; ROICE 202 DX 5 WATT BABY $3.00; HARP 201A $1.59; UV-201A $2.65; UV202 $7.60. NEW UV203A—THE KNOCK 'EM DEAD BOTTLE $37.50. BE SURE TO INCLUDE POSTAGE. LOOK FOR OUR HAM LISTS IN THIS SPACE EVERY MONTH OR IF YOU CAN'T WAIT SEND FOR OUR HAM LIST—NO LOSS PRICES. CURTIS-GRIFFITH COMPANY, 5AQC-5RV, 1109 EIGHTH AVENUE, FORT WORTH, TEXAS.

MAKE $120 WEEKLY IN SPARE TIME. Sell what the public wants—long distance radio receiving sets. Two sales weekly pays $120 profit. No big investment, no canvassing. Sharpe of Colorado made $965 in one month. Representatives wanted at once. This plan is sweeping the country—write today before your county is gone. OZARKA, 853 Washington Blvd., Chicago.

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STORAGE "B" batteries at dry cell prices. Purchase a rechargeable "HAWLEY" storage "B" battery. Non-sulphating or buckling of plates, which means clearer enjoyable reception with unlimited life. Sold in complete knock-down units which requires no former experience to put together. These units contain everything for the actual construction of battery such as large size tested Edison elements, special molded flat bottom glass cells (not ordinary test tubes), punched insulating fibre board for support of cells, pure, annealed solid nickel wire Rubber stoppers, perforated hard rubber separators, full strength chemical electrolyte. With all orders there is included free an 8 page illustrated folder showing simple putting together making of charger and charging. Prices of units as above—22 volt $2.95; 45 volt $5.75; 90 volt $8.95; 100 volt $9.95; 120 volt $11.60; 135 volt $12.75; 150 volt $13.90; 200 volt $17.50. Special voltage units put up at no increase in price. Complete sample cell, 35c prepaid. Complete non-heating "B" battery charger $2.75. Extra special 100 volt whitewood cabinet at $2.75 only. Also "A" batteries at attractive prices. Order direct or write for my literature, 30 days' trial offer and guarantee. Orders shipped same day received. No waiting. B. Q. Smith, 31 Washington Ave., Danbury, Conn.

FOR STATION EFFICIENCY READ QST—THEN GET IT FROM 8ML—THE SHORT WAVES DEMAND NO. 12 ENAMELED AERIAL WIRE. NOW 75c 100 FEET OHIO BRASS CO. PORCELAINS PUT THE ENERGY IN THE WAVE—NOT IN THE ROPE—5" 75c. 10" $1.50 PREPAID THIRD ZONE. FLUX DISTRIBUTING SHIELDS $1.00 ATTACHED. NEXT BEST PORCELAINS, WET PROCESS BROWN GLAZED X INSULATORS 5" 75c PAIR; $2.50 for 10. 9" $1 PAIR. $4 for 10. REAL GUY EGGS $2 FOR 25. LOCAPACITY. LOLOSS TUNER WIRE NO. 12 $1.25 100 FT., NO. 16 60c 100 FT. PREPAID. A REAL HAM-BUILT TUNER 50—150 METERS $5. AIR CORE. 7 PLATE LOLOSS STRAIGHT LINE CONDENSER $4.25 WITH HOOKUP. L AND U SHAPED LAMINATIONS FOR THAT TRANSFORMER AND CHOKE 15c LB., SILICON STEEL. A REAL LEAD-IN OF PYREX GLASS WITH METAL CLAMPING RING, $3.75. (MADE ACCORDING TO KRUSE). NOW GO TO IT OM, AND BUILD THAT HE STATION—GET IT FROM 8ML. FRANK MURPHY, 4837 ROCKWOOD ROAD, CLEVELAND, OHIO.

ARE YOU AMBITIOUS TO BECOME ORS—ASK FOR LATEST HONOR ROLL—Read reports from many students who by little effort won that certificate of proficiency. Method $2.50 Kills hesitation. Dodge Radio Shortkut, Mamaroneck, N. Y.

ESPERANTO! Learn Esperanto and communicate with Radio Fans all over the world. Our free sample lesson contains over hundred illustrations and demonstrates how easily this language can be learned. Send for it now. Benson School of Esperanto, Inc., 20 Mercer St., Newark, N. J.

EDISON B BATTERY SUPPLIES. LARGEST SIZE, TYPE A ELEMENTS 4c A PAIR, DRILLED 5c A PAIR, WIRED IN PAIRS 8c. PURE NICKEL WIRE 1c A FOOT. PERFORATED RUBBER SEPARATORS FOR BATTERIES 1/3c EACH OR CUT YOUR OWN SEPARATORS FROM SHEETS 5 3/16 x 5 7/8" 3c A SHEET. CHEMICALS FOR 5 LBS. BATTERY SOLUTION, ENOUGH FOR 100 VOLTS 75c. EDISON 300 AMPERE HOUR A BATTERIES IN PERFECT CONDITION $56. ALL ARTICLES POSTPAID. SEND REMITTANCE WITH ORDER. BERNARD STOTT, 60 PALLISTER AVENUE, DETROIT, MICH.

AMPLIFY WITH PURE D. C. ON THE PLATE FROM AN EDISON ELEMENT STORAGE "B" THAT WILL SAVE IT'S COST IN DRY "B" BATTERIES. 100 VOLT TYPE A UNIT WIRED AND ASSEMBLED, $12.00. KNOCKED DOWN, $10.00 NEUTRODYNES AND SUPER-HETRODYNES NEED A POWER PLANT AND A TYPE 7-G, 100 VOLT, 3500 MILLI-AMP CAPACITY "B" BATTERY WILL TAKE CARE OF THEM. PRICE $19.50 COMPLETE. SAMPLE CELL, 30c. A FEW MORE 50 VOLT TYPE A UNITS LEFT $5.25 each. POTASH AND SEALING OIL INCLUDED WITH ALL BATTERIES. FIRST GRADE TYPE A ELEMENTS, 5c PER PAIR. 3/4x6" EXTRA HEAVY FLAT BOTTOM CONTAINERS, 3c EACH. NO. 20. GRADE A PURE NICKEL WIRE, 1c PER FT. 7S CELL RACK, $1.95. SEND FOR LIST. J. ZIED, 530 CALLOWHILL ST., PHILA., PA.

RECEIVING AND TRANSMITTING ACCESSORIES. WHAT DO YOU NEED? I HAVE IT OR CAN GET IT MIGHTY QUICK. WRITE FOR COMPLETE LIST. ALL SHIPMENTS C. O. D. ORDER FROM THE SIXTH DISTRICT HAM AND SAVE MONEY. J. F. DAVIDSON, 6CEK, BOX 216, KINGMAN, ARIZONA.

Plate Glass Panels at reasonable prices, beautiful, distinctive. We drill any size to order. Send paper pattern for prices and particulars. Fransen's Specialty Shop, 725 Thurman St., Portland, Oregon.

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50 RADIO GENERATORS, 125 Watt 500 Volts DC 3400 RPM wickoiled. Price $15.00 FOB Chicago. These Generators are slightly used and are in perfect condition. MORTON ELECTRIC CO., 4832 RICE ST., CHICAGO, ILL.

SPOKEN ESPERANTO FOR BEGINNERS—Class textbook, 92 p.—56c. 2, $1.00. Norman Frost, 12 Ash Place, Cambridge, 38, Mass.

20% discount on the following makes of apparatus; Radio Corporation, Western Electric, General Radio, Lopez, Freshman, Crosley, All American and others. Nangle Co., 601 Washington Boul., Oak Park, Ill.

200-20,000 METER receiver including radiotron $25.00; two step amplifier $18.00. Smith, 4416 Market, Philadelphia, Pa.

FOR SALE—3000 Volt 2000 Watt 1750 R. P. M. Double commutator Generator only with coupling and field rheostat $165.00. Also 2500 Volt 2000 Watt 1750 R. P. M. motor generator set, Motor direct current 110 Volt $150.00. Queen City Electric Co., 1734 W. Grand Ave., Chicago, Ill.

CODE MADE EASY and interesting. Alphabet in 15 minutes. Original. New Rhythmic Memory system. Copyright, $1.00. Cheques $1.10. Dept. Q. Kwikkode, 724 Beresford Ave., Winnipeg, Man., Canada.

PUREST VIRGIN ALUMINUM FOR SALE. PARTICULARS UPON REQUEST. 2EM.

We bought $10,000. worth United States Government Aircraft Department Radio Transmitting, Receiving Sets and Parts, get our new and latest reduced price list. Send 2c Stamp for list. Mail Orders answered all over the world. WEIL'S CURIOSITY SHOP, 20 S. 2nd St., Philadelphia, Pa.

9AP SELLING OUT. Write for list.

Large No. of New 275 volt signal corps generators $10 speed 3400. 120 watts. UC1831 variable transmitting condensers new $2. signal corp. Bakelite 9 in leadin 50c. Western Electric condensers 2 mfd $1.25. 1 mfd 75c. ½ mfd 50c. 3 amp. choke $1. COD shipment. R. Wood, 3d Way Ave., Corona, N. Y.

EDISON ELEMENTS 5c per pair. Co-operative Merchandise Co., Chelsea, Mass.

SEND TWENTY-FIVE cents silver for simple formula that easily removes green deposit from storage battery terminals. Theisen, 3415 Meade, Denver, Colo.

RENT AN OMNIGRAPH FROM 9ALD! JUST WHAT YOU HAVE BEEN WAITING FOR—NO NEED TO HAVE A LOT OF MONEY SUNK IN ONE AFTER YOU'RE THROUGH USING IT. HERE'S THE IDEA: YOU SEND US THE MONEY FOR IT WHEN YOU ORDER, OR WE'LL SHIP C.O.D. RETURN THE OMNIGRAPH IN A MONTH AND YOU GET YOUR MONEY BACK, LESS THE SMALL RENTAL. KEEP IT IF YOU WISH—YOUR DEPOSIT JUST PAYS FOR IT. SIMPLE, ISN'T IT? WRITE TODAY FOR YOURS. E. F. JOHNSON, 9ALD, WASECA, MINN.

RENT ME YOUR Omnigraph to learn the code. Paul A. Gable, 623 Chew St., Allentown, Pa.

FOR SALE—Kellogg Coupler $3.00; Acme inductance with grid coil $3.00; Ohio condenser $2.25; Paragon coupler $2.25, 2 Acme transformers at $3.50, Westinghouse Lightning switch $1.00, Oliver typewriter, $10.50, all in A-1 condition, 9DDK, Russell Sindt, Cedar Falls, Ia.

SELL 5 tube Fada Neutrodyne complete; tubes, speaker, Tungar charger, etc. $75.00, W. L. Welch, 601 Cedar St., Nashville, Tenn.

Neutrodyne Hunchbacks—Change that Neut, or build instead of a Neut, the Kladag Coast to Coast Circuit. Same panel, same layout as Neut—fewer parts. Selective with deep resonant volume. Not obtainable elsewhere. One different part. 22 feet gold bus wire, lithographed print, complete, simple instructions—prepaid anywhere, $5.00. Nohting else to buy. Details 10c. 48 page parts catalog 10c. Stamps accepted same as cash. Kladag Radio Laboratories, Kent, O.

YOUR FB REPORTS DEPEND UPON THE STUFF YOU USE. GET THE BEST FIRST, NOT LAST. WE SUPPLY NEARLY ALL HAM MATERIAL AT FROM 10% TO 20% DISCOUNT. WHAT ABOUT THE ANTENNA? GOT PYREX DOING IT'S STUFF THERE? IF NOT, GET THEM. DO YOU USE JUST CONDENSERS OR "CARDWELL'S"? HAM EXCLUSIVELY HERE. GENERAL RADIO EQUIPMENT. JEWELL AND WESTON METERS. ANY TYPE. ACME TRANSFORMERS, CHOKES, TUBES, MOTOR GENERATOR SETS, ESCO. NEARLY ANYTHING IN THE HAM LINE. WE BUILD TO ORDER, WAVEMETERS, RECEIVERS, NEARLY ANY TYPE OF TRANSMITTER. WHETHER RECEIVING TUBE TYPE OR 100 WATTER. WHY NOT CHANGE OVER THAT "AIRCRAFT OUTFIT" FOR USE ON HAM WAVES. WE BUILD MOST ANY TYPE OF SPECIAL INDUCTANCES FOR DIRECT, INDUCTIVELY COUPLED AND MEISSNER CK. IF YOU HAVE PARTS FOR A RECEIVER OR TRANSMITTER SEND THEM IN. OUR CHARGE IS GUARANTEED O.K. "S" TUBE DELIVERIES ARE GETTING BETTER. WE ARE THE ONLY HAMS PUSHING "S" TUBES. WHY NOT ORDER FROM US. ALSO COMPLETE "S" TUBE OUTFITS COMPLETE WITH TRANSFORMER AND FILTER. PRICES ON REQUEST. PUT THAT FONE ACROSS WITH A SPEECH AMPLIFIER. AND USE A GOOD MICK. WE HAVE 'EM. OUT IN THE "GREAT OPEN SPACES" YOU'LL NEED A MOTOR GENERATOR TO RUN FROM YOUR STORAGE BATTERY. WE CAN SUPPLY THEM. MOST ANY TYPE. WE MAKE COMPLETE CONTROL BOARDS FOR HOUSING STORAGE BATTERIES AND INCLUDING THE CHARGING PANEL WITH ALL SWITCHES AND METERS. ON SPECIAL EQUIPMENT WE BUILD THE STUFF NEARLY AS CHEAP AS YOU CAN BUILD IT YOURSELF. LET'S HAVE THE DOPE. THE HAM LINE EXCLUSIVELY. THAT IS WHY WE ARE FB WITH THE GANG. SEND US YOUR INQUIRIES. ESTIMATES GLADLY GIVEN. QSO. THOS. ENSALL, (ENSALL RADIO LAB.,) 1208 GRANDVIEW AVE., WARREN, OHIO.

8ADD'S TRANSMITTING equipment 5 and 50 watt, 2 Kenotrons 150 watts, meters, new Vibroplex, Cardwell transmitting condensers and a lot of other junk in fine condition, will sacrifice. Address Ray Schweinsberg, Boonville, N. Y.

DID YOU KNOW THE CODE BUT SOMEHOW FAIL TO PASS? Latest Honor Roll with reports from many Previous Failures who quickly and easily obtained Amateur License mailed on request. Method $2.50, Kills Hesitation. Dodge Radio Shortkut, Mamaroneck, N. Y.

RENT ME YOUR OMNIGRAPH FOR THIS MONTH. CLINTON BECKMAN, COKATO, MINN.

ULTRADYNE. R. P. Barrows, 4 Columbia Rd., Portland, Maine.

STILL AHEAD WITH THE SHORT WAVE GANG. DOWN TO 10 METERS WITH THE BEST SET FOR HAMS SIGS. ONLY TWO CONTROLS. GENERAL RADIO AND CUTLER — HAMMER PARTS USED. WORKS 'EM WITHOUT ANTENNA. WE CAN INCORPORATE THIS CIRCUIT IN NEARLY ANY TYPE OF RECEIVER. HAVE YOURS CHANGED OVER. SEND NAME AND TYPE OF SET FOR ESTIMATE. THOS. ENSALL, (ENSALL RADIO LAB,) 1208 GRANDVIEW AVE., WARREN, OHIO.

GENERAL ELECTRIC Mercury arc rectifier slightly used rated at two thousand volts works perfectly $10.00; Westinghouse transformer iron thickness fifteen thousandths cut to order, 15c per pound and postage. Harry Smith, Box 99, Lyndonville, Vt.

ACME "200" $13.00. 8ZE.

SELL—Kennedy short wave receiver with two step amplifier for $38.50. C. Bailey, 412 - 11th St., Niagara Falls, N. Y.

FOR SALE — Grebe CR-9, guaranteed perfect condition $69.00; Acme det., 2 step, never used $22.50, first cash takes 'em. 9DRS, Decatur, Ind.

WANTED — 6 or 8 volt dynamotor suitable for a fiver. Edwin Brown, Peckham, Okla.

LOW LOSS COILS CAN BE EASILY AND QUICKLY WOUND ON TRIRAD METAL FORMS. SEND FOR MORE INFORMATION. J. ZIED, 530 CALLOWHILL ST., PHILA, PA.

GREBE CR 9, $58.00 with tubes. Has received England. Magnavox R3, $25.00; tested especially for me at Magnavox factory. Quality better than stock. New condition. J. Eyster, 211 South 42nd St., Philadelphia, Pa.

MAGNET WIRE. ALL KINDS AND SIZES. No. 10 DCC 50c lb., add 2c per lb. for each size up to No. 20, 100 ft. No. 12 enamel aerial wire 35c. Best grade Silicon Transformer Steel cut to size 22c lb. Cash with order postage extra. MORTON ELECTRIC CO., 4832 RICE ST., CHICAGO, ILL.

PARAGON RA-10 regenerative receiver and DA-2 detector amplifier for sale, seventy-five dollars. P. Perazzone, North Bergen, N. J.

SUPER HETRODYNE Experimenters. Model C in mahogany cabinet 40 x 8 inches ¼ in. panel with volt meter and ammeter, also antenna adapter to match, all for $125.00, you can't buy the parts for that. H. B. Puterbaugh, Lanark, Ill.

NEW RCA UC1831 variable transmitting condensers $2.00; send for bargain list. Sammerhayes, 62 Brattle St., Cambridge, Mass.

GENUINE SILICON Transformer steel cut to order 25 cents lb. 10 lbs. and over, 4 cubic inches, weight 1 lb. postage extra. Geo. Schulz, Calumet, Mich.

SELL 200 watt 550-750 volt Acme transformer, 10 volts filament, $11, 9DYT.

RECEIVING AND TRANSMITTING ACCESSORIES. WHAT DO YOU NEED? I HAVE IT OR CAN GET IT MIGHTY QUICK. WRITE FOR COMPLETE LIST. ALL SHIPMENTS C. O. D. ORDER FROM THE SIXTH DISTRICT HAM AND SAVE MONEY. J. F. DAVIDSON, 6CEK, BOX 216, KINGMAN, ARIZONA.

FOR SALE—Paragon RA-10 Receiver and DA-2 Amplifier $65.00. Also other radio parts cheap. Write for list. C. E. Seabold, 841 W. DeWald St., Fort Wayne, Ind.

SPECIAL — RCA or Cunningham Tubes $2.75. Special discount on power tubes and transmitting apparatus. Mastertone tubes all sizes $1.85 postpaid. Nangle Co., 601 Washington Boul, Oak Park, Ill.

FIFTY WATTER, like new, $18. First Money Order takes it. New parts for Harkness reflex, cheap. F. Sterling, 4AL, Youngstown, Alberta, Canada.

STOP & C this BARGAIN LIST:—10 Watt Inductively Coupled 40-200 Meter Set with Tubes, Key 'n everything, mounted & New. Verified Reports fm the "Aussies" & "Zedders"—wrkd Europe, 38 States QSA gg at $45; PT537 15 Amp. Rheostats $6.50; Deforest Honeycomb Mtg. with Coils $4; Mtd Coils DL300 $1.40, DL100 $1, DL750 $2.30; Mtg. $.20; Cambric Cloth 4 Transformer Construction $.75 sq. yd., $.28 sq ft; 5000-15000V. Murdock Moulded Condensers ea. $2; can B used as Filters, By-Pass, etc; 2 New 202 Tubes ea. $5; slightly used 5'er $3.25; Amsco Compensating Condensers, 4 Hets, Neutrodynes, Reflexes ea. $1; Battery Charging Generators $8; 100-550V DC Generators $15; New Double Filament Audiotron with Adapter $4; Chopper with Chambers 3750 RPM Motor, Mahogany Base Mtg $15; DX-RF Transformers with Bases $3 ea; Moulded Sockets $.40 ea; Copper Clad & Nickel Wire ea. $.02 ft; Proudfoot Det. & 2 Stage Amp. Engraved, Mtd in Walnut Cabinet $20; 5-23 Pl. Condensers ea. $1; ¼KW Thorsdon $4; RCA 15-30 H. Chokes ea. $7; Unmtd 1½-3 H. Chokes $2 & $4; DX-TRON 1½V. Tubes—equal to 6V. $2.25 ea; Jefferson Transformer $2.50; Jacks $.20; 20P. 8T. Anti-Capacity Sw. $3; Wavemeters:—Range 30-225 Meters ea. $6; Ultra-Audion Set complete $8; ¾" Bezels $.10, 1½"-$.25; Mahogany strong constructed Cabinets, wonderful appearance 7X12 $2.50, 7X14 $2.75; 4 used "A" Tubes ea. $1.50; LOW LOSS Coil Set $4; 20-225 M. LOW LOSS, 2 Tube, Tuner with Porcelain Sockets, Veniered Cardwell-4" Dials, Tubes, etc. New & complete $35; Broadcast Adaption $5. ACK QUICK NOW & SAVE. 3BOV. S. STROBEL, 3923 N. 6th ST., PHILA., PA.

WELL GANG, AM GOING TO TALK A LITTLE ABOUT OUR NEW NAME THIS MONTH. HAVE DECIDED THAT DYNEX SHALL BE THE NEW MONIKER AND FROM TIME TO TIME WILL ANNOUNCE NEW AMATEUR PRODUCTS UNDER THIS TRADE MARK. "DYNEX FOR DX," "A NAME TO REMEMBER." WELL THAT'S THAT. NOW THEN WHY NOT TEAM UP WITH THAT PAIR OF DISTANCE GETTERS, DYNEX AERIAL WIRE AND PYREX INSULATORS. THEY DO MAKE THE DIFFERENCE BETWEEN GOOD AND POOR RESULTS. NO. 12 "DYNEX" SOLID COPPER ENAMELED WIRE 1c FT. 500', $4.75. 1000', $9.25. NO. 10 DYNEX AERIAL WIRE (FOR HEAVY DUTY) 1½c FT. "DYNEX" HOOPS FOR THAT CAGE. MADE OF COPPER BUS BAR. 8", $2.50. 18", $3.00. 30", $3.50. LET 8BIN "ROLL YOUR HOOP." PYREX GLASS TRANSMITTING INSULATORS $1.50, RECEIVING SIZE 45c. PYREX STAND-OFF INSULATORS $2.50. OHIO BRASS GLAZED PORCELAIN INSULATORS 5", 75c. 10", $1.50. "DYNEX" KEM RECTIFIER ELEMENTS. 1" x 4", 6c EACH. 1" x 6", 7c EACH. 1½" x 6", 8c EACH. ALL DRILLED READY TO PUT IN JARS. IF YOU PREFER TO SWEAT, CAN FURNISH 1/16" LEAD AND ALUMINUM AT 90c SQ. FT. THE ALUMINUM IS C.P. AND IS USED BY A NUMBER OF LEADING HAM STATIONS. GAROD PYREX GLASS SOCKETS. BEAT PORCELAIN FOR THAT 5 WATTER. $1.50. WE HAVE A STOCK OF THE NEW TYPE AMRAD "S" TUBES. THEY MAKE ONE OF THE BEST SOURCES OF RECTIFIED PLATE SUPPLY. $10. MERSHON CONDENSERS $8.00. CARDWELL TRANSMITTING CONDENSERS. $15.00. CONTROL THE FILAMENTS OF YOUR TUBES WITH THE NEW ALLEN BRADLEY RADIOSTAT. $6.50. BASELESS TUBES. ALL RCA TUBES. STATE TYPE OF TUBE WHEN ORDERING. $4.00 EACH. 5 WATTERS $9.00. (NO HORACE WE DON'T TAKE THE BASES OFF FROM 50 WATTERS). NO. 16 D.C.C. WIRE FOR THAT LO-LOSS COIL. 75c LB. OR BETTER YET USE THE NO. 16 COTENAMEL, QST RECOMMENDS IT. 'NUF SED. 75c LB. WESTINGHOUSE TYPE MH, 250 WATT 1000 VOLT MOTOR-GENERATOR. $125. GREBE CR-3 TUNER (NEW) $35. LISTEN FOR OUR 50 WATTER. WILL BE FOUND WITH THE REST OF THE JAM AT 80 METERS. E. J. NICHOLSON, 1407 FIRST NORTH ST., SYRACUSE, N. Y.

AMATEURS! We have those hard-to-get parts that will make your set better. A ham without our list is like a ham without QST. Send for your copy today. Seattle Radio Laboratory, 3335 33rd Ave., South, Seattle, Washington.

For Sale—8DAT's complete fone and C W station; 1 Emerson Motor Generator 750 to 1500, 1 Western Electric type 284 Hand Mic., 2 Fifty watt tubes. Price $250.00 —or will sell separately.

N TUBES—Have eight new norlectric peanut tubes guaranteed good; $4 apiece, or all eight $28. Sockets fifty cents extra. K. Goode, Chemistry Dept., State College, Penna.

SPECIAL PRICE—E.I.S. Super, antenna adapter, loop, tubes, $125.; 3 G.R. intermediate frequency transformers, $9; 2 Federal RF transformers, $12.; generators, 650 volt, $20, 6 volt, $15. Howe & Howe, Canton, N. Y.

"DYNEX AND PYREX THE DX TWINS". "DYNEX" AERIAL WIRE AND PYREX GLASS INSULATORS MAKE A REAL AERIAL INSTALLATION. NO. 12 "DYNEX" SOLID COPPER ENAMELED WIRE. 1c FT., 500', $4.75., 1000', $9.25. NO. 10 "DYNEX" SOLID COPPER ENAMELED WIRE (FOR HEAVY DUTY) 1½c FT. PYREX GLASS TRANSMITTING INSULATORS $1.50, RECEIVING SIZE 45c. PYREX GLASS STAND-OFF INSULATOR. $2.50. O. B. GLAZED PORCELAIN INSULATORS. 5", 75c, 10", $1.50. "DYNEX" HOOPS FOR THAT CAGE AERIAL. STRONG AND LIGHT. MADE OF COPPER BUS BAR. 8", $2.50 18", $3.00, 30", $3.50. PRICES OF OTHER SIZES ON REQUEST. "DYNEX" KEM RECTIFIER ELEMENTS READY-CUT AND DRILLED TO PUT IN JARS. 1x4", 6c EACH. 1x6", 7c EACH. 1½x6", 8c EACH. FOR THOSE WHO PREFER TO CUT THEIR OWN 1/16" LEAD & ALUMINUM 90c SQ. FT. THE ALUMINUM IS THE PURE STUFF AND IS USED BY A NUMBER OF THE GANG WITH FINE RESULTS. CARDWELL TRANSMITTING CONDENSERS, $15.00. WE ALSO CARRY THE RECEIVING CONDENSERS. RCA UL-1008 "BIRD CAGES" $11.00 PYREX-GAROD GLASS SOCKETS. FINE FOR THAT 5 WATT TRANSMITTER, $1.50. THE ALLEN-BRADLEY RADIOSTAT. FOR THE PRIMARY OF THE FILAMENT TRANSFORMER. WILL TAKE UP TO A 500 WATT TRANSFORMER $6.50. GENERAL RADIO TYPE 174C WAVEMETER. 75 TO 1500 METERS. $68.00. TYPE 247W, $10.00 WESTINGHOUSE 200 WATT, 1000 volt MOTOR-GENERATOR COST $180, SELL $125. GREBE CR-3 TUNER, $35. AMRAD "S" TUBES MAKE THE IDEAL SOURCE OF PLATE SUPPLY. CLEAN AND NOISELESS. NEW TYPE 4000-1 $10. MERSHON CONDENSERS $8. NO. 16 D.C.C. WIRE 75c LB. NO. 16 COTENAMEL 75c LB. WE SPECIALIZE IN HAM STUFF SO LET US KNOW YOUR NEEDS. "DYNEX FOR DX", E. J. NICHOLSON, 8BIN, (THE EIGHT THAT PAYS THE FREIGHT) 1407 FIRST NORTH ST., SYRACUSE, N. Y.

TRADE-GREBE RORN-CR8-RORK (COST ME $195.00 GUARANTEED PERFECT). BEST OFFER CW TRANSMITTING APPARATUS TAKES IT. COMPLETE SET PREFERRED. GEO. H. SMITH, CHARLEROI, PA.

WEATHER'S GETTING WARM, EVEN UP HERE. Put up that good new aerial and counterpoise without freezing your fingers. Here's where to get the wire and insulators, of course. We give you the best for the least. No. 12 solid copper enameled wire, any length one piece, $6.90 per thousand feet, 75 cents per hundred for less. No. 14 enameled. $5.00 per thousand, or 55 cents per hun-

SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

dred—it's fine stuff for the Ham who wants real quality with the smallest investment: For the insulators, Sure Fire 20 inch porcelains are the real thing. Perfectly glazed highest quality high tension porcelain, 1500 pounds strong, $1.00 each for four or more, or $1.15 for less. Some low priced good insulators, 5¾ inches long, 1½ inches diameter, finely glazed, estimated strength at least 2000 pounds, 30c each, lots of 20 or more, 25c each, FB for guys; Allen-Bradley RADIOSTAT, for primary of the filament transformer, $6.50, E-210 Bradleystat, for the 5 or 10 watt set, $4.00; 99% pure 1/16th inch aluminum and lead, 75c and 90c per square foot; UC-490 1 mfd 1750 volt filter condensers, $2.50, 21-AA 1 mfd 1000 volt, $1.90, a few UC-487 ½ mfd 750 volt condensers left at $ .85; UC-1831 condensers, .0001-.0012 mfd, 4000 volts, variable for antenna series, $2.25; UC-1015 antenna series condensers $2.25; UC-1806 .002 6000 volt grid or plate blocking condensers, nearly all gone now, $1.50 each; UP-1719 5 watt grid leaks, $1.10, UP-1718 50 watt leaks, $1.65; Real low-loss sockets, Garod Pyrex $1.50, Fleron porcelain $ .65, UT-541 for 50 watters, $2.25; 284-W microphones, $3.75, with desk stand, $7.80; Signal R-48 keys, very sturdy construction, $2.25; UP-414 Microphone transformer $6.50; UP-415 plate reactor $5.20; General Radio wavemeters, 150-500 meters, $9.50, 75-250 and 37.5-125 meter coils extra, $2.85; JUST A FEW RCA METERS LEFT NOW. 0-5 THERMO-COUPLE AMMETER, LIST $20.00, ONLY $9.00, 0-2.5, $8.00; 0-1500 DC PLATE VOLTMETER, LIST $40.00, ONLY $17.00; Jewell meters always in stock, milliammeters and AC filament voltmeters, $7.15, thermo-ammeters $11.40; Newest amateur call books, 75c, Ballantine's Radio Telephony for Amateurs, $2.00; All sizes magnet wire from 10 to 28, cotton covered; 60 strand wire for 9APW short wave inductance, 100 ft. spool, $1.00; Transmitting inductances, like RCA, $7.50, clips are extra, 40c each; Edgewise wound copper strip, 1/16 by ⅝ inch, 6 inches inside diameter, 12c per turn. 4 inches diameter, 10c; GET THE HAMALOG, OUR REAL HAM CATALOG, and PLEASE, when you order, send enough money for postage. E. F. JOHNSON, 9ALD, Waseca, Minn.

NEW EIGHT tube Ultradyne with tubes and loudspeaker $110. Three tube Navy's best receiver 140-3000 meters $45. VT1 tubes $4. Three tube Regenerative, tubes and phones $30. One tube Autoplex completely equipped $25. Inquiries answered. Carroll Baldock, Amherst, Virginia.

HAMS TWO COLOR QSL cards 75 cents per 100. Write for free samples. 1-AOP Theodore Parker, 23 East St., Fitchburg, Mass.

FOR SALE, transmitter, complete with meters, transformers, etc. Write for particulars. Burt Barber, Washington, Indiana.

CHEMICALS FOR 5 LBS. EDISON BATTERY SOLUTION, ENOUGH FOR 100 VOLTS 75c PREPAID. BERNARD STOTT, 60 PALLISTER AVE., DETROIT, MICHIGAN.

IT WILL ONLY COST YOU ONE CENT TO FIND OUT ABOUT MY NEW TRANSMITTING INSTRUMENT. DROP ME A POSTAL. 2EM.

MOTOR GENERATOR Bargains. Robbins & Myers Motor 110 Volt 60 cycles single phase generator 750 Volt 400 Watt $60.00. Robbins & Myers motor 110 Volt 60 cycles single phase generator 500 Volts 200 Watts $45.00. G. E. Motor 220 Volt 60 cycles 3 phase 1750 R. P. M. Generator 400 Volts 150 Watts $35.00. Esco Motor 220 Volt Direct Current Generator 500 Volt 200 Watts, $35.00. Esco Motor 220 Volt 60 cycles single phase A. C. Generator 500 Volt 200 Watts $40.00. 1000 V. 400 Watt 1750 R. P. M. Generator only $60.00. Esco B. Battery charging motor generator sets, generator 175 Volts Direct current 1½ Amp. motor end alternating current $37.50 each. 750 V. 200 Watt 3400 R. P. M. Generator only $30.00. All above machines are ring oiled and prices include field rheostat. Queen City Electric Co. 1734 W. Grand Ave. Chicago, Ill.

$5.00 NEW UNITED STATES Government Aviators Leather Helmet with headphones and microphones, cost $25.00. Postage free. Send at once, limited supply; other Government Radio Bargains. Send stamp for list. WEIL'S CURIOSITY SHOP, 20 S. 2nd St., Philadelphia, Pa.

DYNAMOTORS 30v input 300v output $8. ¼ HP. 32v motors $10. ¼ HP. GE 1800 speed AC $12. Same at 3400 speed $16. 220 watt 900 cycle generator $10. Plenty of above and unused. Wood, 151 East 108 ST., N. Y.

SELL OR TRADE—New Kennedy Intermediate Receiver with two step amplifier, 175-3650 meters. Want Western Electric 14-A loud speaker, equivalent or what have you? R. M. Ireton, Saginaw, Mich.

ARE YOU ANCHORED AT 1-15 PER—ON REQUEST WILL MAIL LATEST HONOR ROLL WITH REPORTS FROM MANY OLD METHOD KEY AND BUZZER HAMS WHO IN A FEW HOURS DOUBLED SPEED. METHOD $2.50. KILLS HESITATION. Dodge Radio Shortkut, Mamaroneck, N. Y.

WANTED—Omnigraph or similar machine for learning code; cheap. Roy Van Houten, Midland Park, N. J.

SUPERHETS. R. P. Barrows, Portland, Maine.

GREBE 13 new with tubes $40.00; Harry Biederman, Osseo, Minn.

$50. TAKES MY TRANSMITTER—I need money badly, one Radio Corporation Inductance, two Acme chokes, one Weston T.C. ammeter, and filament voltmeter, one 300 watt center tapped 1000 volt plate transformer with filament windings, one Vibroplex key, one U.V. 202 with rheostat socket, etc. DX—2000 miles daylight. Cost me $100., first Money Order for $50. takes it. S. Stowell, Ellensburg, Wash.

MAGAZINES FOR SALE at 15c a copy. Wireless Age, from Nov. 1915 to Aug. 1923—Radio News, from Jan. 1920 to Feb. 1923—Electrician and Mechanic, from April 1908 to Nov. 1913. All are full of interesting "dope." Roger McKibbin, 47 Elmwood Ave., So. Norwalk, Conn.

GENUINE EDISON TWIN-CELL B-BATTERIES IN NICKELLED STEEL CONTAINERS, 40 Cells, in Standard Edison Tray, $20. Your opportunity to get a lifetime battery. Special Prices on High Rate Bulb Chargers, 10-15 Amperes, $25 up. 20-30 Amperes Full Wave, $35 up, without bulbs. These will put pep into your Edison Battery. Photos 8c. Standard Chargers, for 4, 6, 12 volt "A" and up to 120 volt "B", $16. Send for Circular. A. R. Spartana, 615 N. Washington St., Baltimore, Md.

ALUMINUM—99.9999% PURE—ASK 8ZE.

VERY FEW LEFT TO GET. WE HAVE SOME UP-1016 TRANSFORMERS, PLATE AND FILAMENT SUPPLY FOR TWO 50 WATTERS AND TWO KENOTRONS, LIST PRICE $38.50, WHILE THEY LAST, $22.50. MOST OF THIS RCA STUFF IS GONE. GET THESE BEFORE IT'S TOO LATE. E. F. JOHNSON, 9ALD, WASECA, MINN.

UV203, slightly used $12.50. 3BOV.

LATEST TYPE CW 938 Navy Transmitter-receiver, rebuilt with GOOD receiver and Western Electric push-pull amplifier, $75. E. J. Rodgers, 2110 Amsterdam, Ave., N. Y. C.

PERFORATED HARD RUBBER SHEETS, SIZE 5 3/16 x 5⅞", SUITABLE FOR INSULATION IN ALKALINE OR LEAD B AND A BATTERIES, FOR SALE IN WHOLESALE QUANTITIES. IF INTERESTED WRITE FOR SAMPLE AND PRICES. BERNARD STOTT, 60 PALLISTER AVENUE, DETROIT, MICH.

FOR SALE—EDISON "A" BATTERY TYPE B-4 $35.00. Herbert Mayer, 7121 Thomas Blvd., Pittsburgh, Penn.

OMNIGRAPH—WANT LARGE GOOD CONDITION MODERATE PRICE. N. Bestereo, 25 South Street, New York City.

CHEMICALLY PURE ALUMINUM ⅛ inch $1.90, 1/16 inch $1.00; sheet lead $1.00 per sq. foot, postage paid. Geo. Schulz, Calumet, Mich.

FOR SALE—8 tube Ultradyne receiver, $65.00; 6 tube second Harmonic super, $55.00; 4 tube Neutrodyne reflexed, $35.00. F. W. LEHR, 11 S. GAY STREET, BALTIMORE, MARYLAND.

QSL CARDS, ENVELOPES, etc. Samples and prices for a stamp. Erwin Martens, Gresham, Nebr.

MAGNAVOX type AC2 model C two stage amplifier for sale. Excellent amplifier in perfect condition. Real Bargain, first $30. H. M. Lowrie, Osakis, Minn.

BARGAINS — Acme 500 watt Plate and 200 watt Filament Transformers, Acme 20 Henrychoke, Two 50 watters and sockets, 4 RCA 1 mfd Filter conds. Jewell meters, 0-1500 volt DC, AC 0-15. Milliamp 0-300, etc. Prices on request. 2JD.

WRITE FOR list of guaranteed bargains. RCA General Radio EIS and other reliable parts. R. P. Barrows, 4 Columbia Rd., Portland, Maine.

FOR SALE—UP1016-750 watt transformer $16. Lot of transmitting and receiving parts. Send for list. Boyer, 6116 Howe, Pittsburgh, Penna.

BRAND NEW Bruno 44 plate condenser, five dollars. Absolutely unused. L. R. Hennessy, Hudson, N. Y.

FOR SALE: New Grebe CR3, guaranteed perfect, $35.00. General Electric ¼ H.P. 110 volt AC motor $18.00. F. J. McLane, Jr., 32 Underwood St., Fall River, Mass.

FOR SALE—At half list price. The following new Weston Meters, 1 model No. 429 AC volt meter 0-15, list $20.00; 1 model No. 429 AC volt meter 0-10, list $20.00; 1 model No. 401 Antenna Ammeter 0-20, list $32.50; 1 model No. 431 DC Ammeter 0-3 list $18.00; 1 model No. 431 DC volt meter with resistance 0-2000, list $48.00. Cash with order. Theodore H. Cowee, Box No. 32, Berlin, N. Y.

WE BUILD TO ORDER ANY SPECIAL HAM EQUIPMENT. WAVEMETERS, TRANSMITTERS, RECEIVERS, etc. GET THE DOPE FROM "HAM EXCLUSIVELY." THOS. ENSALL (ENSALL RADIO LAB.), 1208 GRANDVIEW AVE., WARREN, OHIO.

WHEN YOU GROW WEARY OF CHANGING THE CLIPS on your storage A&B Batteries every time you want to charge either battery, think of this ad and know that complete instructions and diagram for a simplified hook-up to control A & B Batteries and charger can be had for the small sum of fifty cents. Leo A. Price, 886 Euclid Ave., Akron, O.

LOOK: C. W. Transmitter $20. Send for photograph. George McKay, Xenia, Ohio.

U. S. NAVY DYNAMOTORS built by General Electric 24/1500 volt .233 ampere 6000 RPM 750 volt tap. Triple commutator. Ball bearings. Little filtering required. Original boxes $45. Some slightly used $25.00. Guaranteed perfect. IDEAL FOR 32 VOLT PLANTS. With shaft extension shaft for belt drive $3.00 additional. Proper size pulleys for any speed motor with endless belts on order. Noiseless. Either model operates on 6 volts generating 300-400 volts; 8/450-550; 10/575-675; 12/700/800; etc. Holtzer-Cabot 12/500 .07 ampere $18.00, Crocker-Wheeler 24/1500 volt 450 watt, 100 segments, 6500 RPM $45.00, 1/2 KW 500 cycle ship model $65.00, Navy Flame Proof Keys with blinker light $2.00 Postpaid. COST $16.50. Henry KIENZLE, 501 East 84th Street, New York.

JEWELL THERMO, 0-10 Like new $5. 2 CEL.

SELL—EMERSON 500 volt Motor-Generator set. Never used. 8 ATZ, 20 Walnut St., Salem, Ohio.

EDISON TYPE A ELEMENTS 4c A PAIR. BERNARD STOTT, 60 PALLISTER AVE., DETROIT, MICHIGAN.

WANTED — OMNIGRAPH MUST BE LESS THAN $8.00. WRITE 9 AXF.

NEW APPARATUS: 300 watt Acme CW transformer cost $25., sell $20., 2 Dubilier RF transformers at $3.00 each. Used Acme 200 watt transformer $12.00. Parts for 20 watt CW transmitter. 9EJY, 9323 Rhodes Avenue, Chicago.

SELLING OUT between 75 and 20000 meters, 20 watt transmitter. DeForest MR-6 receiver. A 150-700 Amrad Regenerative Receiver, each with two-step amplifiers. RCA Loop. Wave Meter. 550 volt Motor-Generator, and others. Western Electric speaker and amplifier wavemeter, omnigraph. F. L. Wilcox, 9AAL, 4602A Delmar Blvd., St. Louis, Mo.

MASTER CODE IN FIFTEEN MINUTES—10 WORDS SPEED in three hours. These world records made by our students. New 1924 Honor Roll tells code learning story as reported by TWO HUNDRED students all now licensed; some in each radio district; copy free on request; method $2.50; kills hesitation; Dodge Radio Shortkut, Mamaroneck, N. Y.

COCKADAY 5 tube four circuit tuner in solid walnut cabinet at less than price of parts. $50.00 takes it. H. B. Puterbaugh, Lanark, Ill.

Edgewise wound copper ribbon the only really satisfactory antenna inductance .350" wide; 4¼" outside diam. 13c turn; 5¼" outside diameter 15c turn; 6¼" outside diameter 17c turn; 7¼" outside diameter 20c turn, prepaid any number turns in one piece. Geo. Schulz, Calumet, Mich.

GREAT REVIVAL! Audio transformer revived. Your burnt out transformer brought back to normal activity. The charge is only $1.50. Satisfaction guaranteed or money refunded. Standard makes only. The Radio Research Laboratories, Box 507, New Bedford, Mass.

FOR SALE—Alternating generators for plate excitation, 500 to 900 cycle, U. S. Army Airplane units 200 watts. Price $10.00 each. Robert B. Bridge, 5EL, Bartlett, Tex.

GREBE CR 13—First money order for thirty-five dollars takes new Grebe CR 13. Wm. Retzbach, Washington Place, Englewood, N. J.

GENUINE WESTINGHOUSE STORAGE BATTERIES "B" (glass cases) 22 volt units, $3.95, list $7.15. "A" (rubber cases) 70 A. H. $11.00 list $16.30; 100 A. H. $14.00 list $20.50. DEALERS' COMMUNICATE GEORGE VOIGT, MASPETH, N. Y.

GREBE "13" New $60.00; CW936 Filter, $25.00; 1½ Henry Choke, double, (used) $2.00; 2 Acme R-F Transformers, $1.50 each; 1 Omnigraph 5 dials, $15.00; 2 UC1014 .002, $75.00 each; Western Electric Power Amplifier, Navy type with special loud speaker $50.00. ERNEST ROY, FINDERNE, NEW JERSEY.

CUNNINGHAM and RADIOTRON receiving TUBES any type $2.75 each POSTPAID. Number 12 enameled aerial wire 90c per hundred feet postpaid. Karl L. Peterson Laboratories, Weldon, Illinois.

JOBBER & DEALER CLOSE-OUT PRICES on receiving sets as Crosleys, Mu-Rads, Atwater-Kents, Radiola, Miraco, Freshmans, Freed-Eisemann, etc. Standard tubes, Batteries, etc. Write for list, HARR, NORA SPRINGS, IOWA.

HAMS: Get our Samples and Prices on Printed Call Cards made to order AS YOU WANT THEM. 9APY HINDS & EDGARTON, 19 S. Wells St., Chicago, Ill.

RADIO GAME. A fast instructive contest of wits, with plenty of laughs and any number can play. First, second and third prizes. No dull moments waiting for heavy plays. Cards of finest, round corner four-ply bristol, printed in colors, 75 cents postpaid. Triangle Specialty Co., 1517 14th St., Santa Monica, Calif.

NO. 12 HARD DRAWN TIN COPPER 1c FT. NO. 12 ENAMEL SOLID COPPER 1c FT., $4.25 PER 500 FT. $7.50 PER 1000 FT. NO. 12 D.C.C. 65c LB. NO. 16 D.C.C. 65c LB. NO. 16 ENAMEL D.C.C. 90c LB. NO. 16 ENAMELED SOLID COPPER ½c FT. PYREX LEAD IN AND AMATEUR INSULATORS $1.50 EACH. ADVANCE SYNCHRONOUS RECTIFIERS $40.00 F.O.B. PITTSBURGH. LOW LOSS COILS AND TUNERS MADE TO ORDER. WRITE FOR QUOTATIONS. 8AGO, BIDDLE ARTHURS, JR., 3046 CENTRE AVE., PITTSBURGH, PA.

AMRAD "S" TUBES, type 4000-1, $10.00 post paid, insured, mershon condensers, $6.80, f.o.b. George Voigt, 56 Maiden Lane, Maspeth, N. Y.

FOR SALE—General Electric United States Army Air Service, double current generators and dynamotors, 12 volt, battery drive—550 volt output, each equipped with a Dubilier filter system, $15.00 each—Westinghouse Navy Dynamotors, 30 volt drive—400 volt output, $15.00. All

generators guaranteed new. United States Navy Submarine chaser, Western Electric Type, CW936 transmitters and receivers, complete with tubes, wired for CW—ICW—phone—outfit is brand new—first check for $300. takes it. Navy battleship receivers, type CN240—1000—10,000 meters bargain $60.00. Western Electric power tubes ¼ KW type "T". Same tube is used in their broadcasting stations, $100. Their 50 watters, $32.—General Electric type 203A 50 watters, at $31. United States Army Signal Corps. short wave receivers, with built in tube socket, range—50— 225 meters, brand new, $75. These were built by the Marconi Company of America. Signal Corps precision heterodyne wave meters built by General Radio Company special $40.—1 Esco Motor Generator—motor 60 cycle, single phase 110-220 volts-generator 1400 volts—500 watts equipped with 200 watt winding for filament excitation—will sacrifice guaranteed in perfect condition, $180. Western Electric Navy 5 watt "E" tubes, $7.00—"J" receiving tubes $6.50—1 Grebe type CR13 short wave receiver brand new, never used, will sacrifice. Cost me $95. will sell $48.—Arthur Faske, 1515 Eastern Parkway, Brooklyn, N. Y.

STOP—AMBASSADOR Type Couplers, $3.50. Audio transformers, 5 to 1 ratio, $4.00 each. Dealers and agents write for list and discount, Vanda Company, 46 Thomas St., Newark, N. J.

Q R A SECTION

50c straight, with copy in following form only: CALL — NAME — ADDRESS. Any other form takes regular HAM-AD rates.

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1ASN—A. L. Budlong, Glastonbury, Ct., address at Headquarters; 1DQ, J. M. Clayton, ditto; 1OX, L. W. Hatry, ditto, 1XAQ, 1OA, S. Kruse, ditto.

2HG—W. W. Kenyon, Jr., Smithtown, L. I.

q2MK—R. V. Waters, Galiano, No. 29, Havana, Cuba.

3LJ—Edward S. Rahn, 1519 No. Allison St., Philadelphia, Pa.

3LZ has been assigned to R. E. Parsons, 23 North St. Bernard St., Philadelphia, Pa. All calls and cards answered promptly.

3SK—C. W. Millard, 80 Nassau St., Princeton, N. J.

5ATP—J. C. Howell, 5 Woodward Ave., Montgomery, Ala.

g5KO—T. W. Higgs, 24 Leazes Terrace, Newcastle-On-Tyne, England.

5PI—Edwin Brown, Box 156, Peckham, Okla.

6APD—Chandler Brownell, 862 East 6th Street, Pomona, Calif.

g6FG—N. Hendry, Hertford House, Sanderson Road, Newcastle-on-Tyne, England.

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8CTH—Francis Laverty, 224 So. 11th St., Olean, New York.

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(continued from last month)

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SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

—FOR YOUR CONVENIENCE—

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SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T

The Traffic Department

F. E. Handy, Acting Traffic Manager
1045 Main St., Hartford, Conn.

1KV comes forth to carve the first notch in the Traffic Department Trophy with 625 messages to his credit. His lead seems to be safely tucked under his arm as his nearest competitor was 8ACM with 283 messages. All that remains for 1KV to do to cop the prize is to repeat his performance two more months in succession. This is not going to be as

A BUSY CONTESTANT

easy as it seems because there is a number of amateurs who are bent on winning this prize and 1KV will have to step right along to maintain his lead. 1KV takes the honor position this month.

W. F. Dunklee—1KV
Middletown, Conn.
New England Division
625 Messages

Brass Pounders' League

Call	Messages	Call	Messages
1KV	625	5QY	178
8ACM	283	1BCR	168
6CSO	218	6CC	163
9DTK	207	9AZN	161
1II	201	6BLH	153
9BPN	192	8BYN	152
9AVJ	186	9DPC	152
5QK	182		

1KV, 8BYN and 9DTK are the only ones appearing in more than one list of the Brass Pounders' League. 8BYN dropped from 176 messages to 152, but 9DTK jumped from 156 to 207 messages. We hope the "main guy" isn't slipping in his traffic work. And where is "Slim" of 8PL—the bird who can pound them out with the best of 'em? 1MY seems to have fallen from grace a bit, but unless we miss our guess badly 1II and 1MY will have big totals for next month or as long as Miss 1AID will QSO 1II via radio. 1AID was a visitor to A.R.R.L. Headquarters, the first YL to visit us, and by the way, the very first station to QSO 1MK when our headquarters station went on the air. Miss Lorentson is a real operator who can ham it with any of the gang.

At this writing there isn't enough information back on the Daylight Transcons (February 22, Washington Birthday Relay) to say just what happened. We must ask you to QRX for May QST as the logs didn't come in fast enough. Nothing is back on the Governors'-President Relay as yet. All the dope will appear next month.

This is "FS" signing off—QRX six months fellows—F. E. Handy, Acting T. M. will now punch the keys of the mill.

Your Acting T. M. has just returned from the Second District Convention. As you know, fellows, "FS" will be away for six months. In the meantime don't forget to carry on with the splendid work that has been started, and don't forget to watch for NRRL. Your A. T. M. will do his best to keep things moving at Hdq. with your help. None of us are perfect—there are bound to be jams at times—but feel assured that if you will give me your cooperation and suggestions, and maybe sometimes your forbearance, that we can put it across, and show "FS" a creditable summer's record when he returns to you in the fall.

The first thing that we must talk about is something that it is not so pleasant a subject to discuss. It is something that has been brought before you on the Editorial page, and now we must recognize the facts of the story, and take action, both individually, and as an organization!

When the Department of Commerce allowed us to use short waves during quiet hours, it was with the understanding that transmitters could be built that were non-interfering, that we would use transmitters that could be worked through the quiet hour period without causing interference to BCL receivers. QST printed information regarding the constuction of such a transmitter. From time to time technical articles have appeared offering suggestions for the elimination of key clicks, and for the correction of brute power supplies to make them non-interference producing. The Department of Commerce allowed us to operate on short waves through the quiet hour period, with the tacit understanding that we were not to create interference. Such stations as interfered were to be closed by the Supervisor from 8.00 until 10.30 in the evening. Quiet hours were to be the exception—not the rule.

What happened? Operating on short waves became popular because of the unlimited possibilities of increased DX with low power. The same old sets were shifted to shorter wavelengths and operated as in the past. 1CW, ACCW, unfiltered or poorly filtered plate supplies continued to punch the old hole in the local atmosphere. The type of keying used continued to produce key clicks that could be heard on 500 meters. Many sets were made inductively coupled it is true, but inductive coupling does not mean LOOSE coupling necessarily. What was the result of all this? The result was an increased number of complaints received by all the Supervisors of Radio, and an increased strain on the patience of the local BCL. The situation has been growing worse daily, and now the time has come when we must make a decision and take definite action on what is to be done. We know that perhaps the amount of QRM the average BCL gets from amateurs may be estimated at less than 3% of all the interference he gets. We know that most of the interference the BCL has cannot be controlled. But we also know this—that the interference from Amateurs CAN be controlled. And how can it be controlled does someone ask? It can be controlled by shutting us down during quiet hours on all wavelengths. Just as surely as the tide of public opinion is now in our favor—that same mighty power will be forcing the Dept. of Commerce to take some action and put the lid on for keeps unless we do something about it. We also

have a good notion that when they do this the quiet period will be shifted to 7.00 to 11.00 or possibly 6.00 to midnight. We know that the amateur is not always at fault, that rotten non-selective BCL tuners exist still. Pointing out the fact that every receiver needs the power to exclude as well as receive signals does no good. We can only attempt to correct conditions, and to assist the BCL to make his receiver operate better than it does. No need to go over all this again—you fellows know just where the weak spots are in your localities.

But the real question before us is this: WHAT ARE WE GOING TO DO ABOUT IT? We must do a little house cleaning on our own account. Ask yourselves these questions. Does MY transmitter bother listeners in my locality? Just what is the extent of this interference? Where does the trouble lie? What can I do to better the situation?

The real question that is going to be answered (whatever we do) is this: DO WE OR DO WE NOT WANT QUIET HOURS ON ALL WAVELENGTHS ENFORCED BY THE DEPARTMENT OF COMMERCE??? It is up to us to decide and our action is going to determine the answer to this question.

If you take steps to see if you are interfering, and find the trouble in a poor BCL tuner, which picks you up while other BCL's around you do not get any QRM, of course the fault is not yours. But you should take steps to help this man fix his tuner, using a wavetrap, or perhaps a loose-coupled antenna circuit, to make his set work better. The A.R.R.L. is going to give you every assistance. See the article by FHS elsewhere in this issue on the organization of Vigilance Committees. These committees, and your local clubs, can help to relieve the situation materially and they yill see that everyone gets a fair deal.

If you experience trouble getting your set to operate without interference it is up to you to take the proper steps to correct the set, and until it does operate properly it is up to YOU to observe VOLUNTARY QUIET HOURS.

Tests to see that your transmitter is operating properly should be made on a BCL receiver, and the ordinary oscillating amateur tuner is NOT a good one to use when testing for interference as is commonly supposed. Your atrocious plate supply MUST be filtered, and the keying MUST be improved until a working test with the majority of your neighboring BCL's shows that there is no interference. It is of no use to try to cover up a festering condition. Meet it fairly and squarely and we will answer the big question right fellows. Not only use inductive coupling, use LOOSE coupling. There is a vast difference between the two. By using loose coupling you will get more of the energy that goes out on one wave, your efficiency will be improved, and you will get rid of troublesome key clicks at the same time. A little more engineering, or applied common sense, will produce results and improve the feeling locally. You will have a better station and can do better DX than ever.

Use past QST's, cooperate with the Vigilance Committees, and do your part. If everyone will put his shoulder to the wheel with a boost we will soon be on the road to making the RIGHT answer to that question. The Vigilance Committees are with you to see that we all get a square deal. One man hanging back, cannot put the game on the bum for the rest of us. Those committees are going to report to us just who is hanging back—and the Department of Commerce is going to know about it too.

F. E. H.

Please write in and tell us what you think of these. Any new suggestions, or definite opinions regarding these will be welcomed. We want to carry out what the gang as a whole want. To do that we must have a word from you. If sufficient interest is expressed in the form of QSL cards or radiograms to 1-MK, you will hear more about that idea. Don't forget to give us your new ideas OM.

Here are the present suggestions. c2BN suggests certain bands of waves, and a schedule at certain hours each week on certain specified nights when "old timers" can work each other. u2CPO likes this and also suggests that we have a traffic handling wavelength of 150 meters not to be used unless there is traffic to be handled. The CQ Europe birds can do their experimenting on the low waves. All we want to know is what you think about it gang.

A.R.R.L. Vigilance Committees

By F. H. Schnell, Traffic Manager

SO great has been the volume of mail received at the various offices of the Supervisors of Radio that our Secretary Warner made a trip to Washington to find out just what the A.R.R.L. might be expected to do toward clearing the air. The Supervisors of Radio have received many hundreds of letters from B.C.Ls. complaining of "code interference." Just how much of it is caused by amateur transmitters we don't know, but we think only a small percentage. However, the Vigilance Committees will be able to judge more definitely if they function properly.

Secretary reported back to the Executive Committee and after going into every detail of the report came to the conclusion that the only way out was to organize Vigilance Committees in every city where sufficient amateur activity warrants such a committee. We are faced with the restoration of quiet hours unless we voluntarily do every possible thing to lessen interference as much as we can from amateur transmitters, in fact there must be no interference from amateur transmitters during quiet hours. When we know our transmitters cause interference then we must observe quiet hours without waiting to be told to do so.

Now, do we want those quiet hours? No, we do not. What is the solution then? If we could depend absolutely on each and every transmitting amateur to make such adjustments as would cause no interference or observe quiet hours we could stop right here, but we cannot, because we know there are those who will not take time and trouble to do this. Therefore, the suggestion of our head Inkslinger, J. K. Bolles, Manager of the Publicity Department, was Vigilance Committees and the Executive Committee came to the conclusion that this was what we need.

And here is how they are to be organized and how they are to function.

Each ADM, of the Traffic Department, will be charged with the duty of appointing somebody in each city of sufficient amateur activity to act in organizing a Vigilance Committee. This committee is to consist of at least three A.R.R.L. Members who can read the code, one B.C.L. and a publicity man or newspaper correspondent —five men in all. This makes each committee consist of five men.

It is through the newspaper that information of complaints can be secured, hence the need of a Publicity Department man or a newspaper man. This is important. As soon as a Vigilance Committee has been organized, such announcement should be made through the newspaper and it must be stated that this committee will deal only in that interference caused by amateur transmitters. The newspaper is to make a dennite request for complaints and these

complaints are to be addressed to the secretary of the Vigilance Committee or the newspaper. When sufficient complaints have been received, they should be reviewed and the center of interference can then be determined.

Then certain members of the committee, preferably amateurs who can read telegraphic code, are to visit chosen B.C.Ls. and make a study of the interference. If it is something that is other than a transmitting amateur station, such mention is to be made in the report to the Vigilance Committee and recommendations may be made. However, if it happens that the interference is being caused by an amateur transmitter the Vigilance Committee shall take immediate steps to get in touch with the offender and inform him of the complaints. Then arrangements can be made whereby the offending amateur may conduct tests after he has attempted to adjust his transmitter and if tests show that his transmitter causes no further interference he may continue to transmit during the Quiet Hours. On the other hand, if no matter what he does to his transmitter to adjust it properly and it still causes interference, the Vigilance Committee shall request him to observe Quiet Hours on all amateur waves which cause interference. Failing to heed this request, the Vigilance Committee then will send a complete report to A.R.R.L. Headquarters and A.R.R.L Headquarters will request the Department of Commerce to have this offending amateur observe Quiet Hours.

At first reading this may make you boil under the skin, but stop and think just why it is necessary. We are facing the same old story of interference—we haven't had sufficient time to learn whether or not we can adjust our transmitters to the lower amateur bands and transmit without interference and until such time the Department of Commerce is putting us on "our own" to say whether or not we can do it. We won't do it by sitting around in a corner and pouting or grumbling—we've got to get right down to business and do it now. Unless we do what is expected of us while we are on "our own" the Department of Commerce will restore Quiet Hours. And they will be stiffer than ever. We now have the Quiet Hours from 8:00 to 10:30 P.M., but the next time they probably will be from 7:00 to 11:00 P.M. or from 6:00 to midnight and Gawdnose we don't want that.

HOW TO USE THE FINISH SIGNS AR-K-SK

By Don C. Wallace (9ZT-0XAX), Manager Dakota Division

IN listening to the various stations over the air, a lack of uniformity seems to exist in the way in which the terminations "AR", "K", "SK", are used. Everyone seems to have his own idea on this subject as to what is correct and what is not correct.

At 9ZT a standard procedure has been adopted which has as its basis the international radio laws, the laws of the United States, and the regulations governing Navy Procedure. Unfortunately, the rules and regulations of our Traffic Department have never covered this phase of amateur operation. If these signs are used correctly they mean a great deal, and will save time in operation. In order to get them straight various definitions should be given.

"AR" means: *I am shutting down my transmitter, and expect to listen for you, but am not in communication yet.*

"K" means: *I am in communication with you, and desire you to go ahead. I will not listen to any one else.*

"SK" means: *I have been in communication with you. I am shutting down my transmitter, and will not listen to you any longer as we have finished our communication. I will tune for anyone who cares to call me.*

Strange as it may seem, these definitions fit in very closely with the different rules and regulations and procedures as outlined above. An example of their use would be as follows:

"KA CQ CQ CQ u 1XW 1XW 1XW CQ CQ CQ u 1XW 1XW 1XW CQ CQ CQ u 1XW 1XW 1XW AR." Applying our definition to this simply means this:

I am calling CQ and will listen for answers to my CQ and am tuning.

Suppose 1XW raises 6AWT. 6AWT should come back, "KA 1XW u 6AWT K". 6AWT may have to repeat the call as seems logical with the distance and conditions prevailing.

1XW then comes back, "KA 6AWT u 1XW GE OM QTC? 6AWT u 1XW K".

6AWT then says, "KA 1XW u 6AWT GE OM NIL here. See you later. 1XW u 6AWT K".

It is right here we wish to explain that this is not the place to use SK, as he expects 1XW to come back to him, once more. The term "SK" should never be used when we expect to listen to anybody in particular. Thus we see it would be entirely out of order for 6AWT to say "SK" until he had received an acknowledgement of his indication to 1XW that the communication was about through.

1XW then comes back to 6AWT, "KA 6AWT u 1XW NIL CUL 73 6AWT u 1XW SK". As 1XW says "SK" and closes down his transmitter, he immediately starts to tune in order to see if any one else is calling him.

Once more we want to repeat just one thing. "SK" should be used only at the close of the transmission. The close of the transmission *really means the close of the transmission*, and the tuner dial should immediately be turned following the issuance of "SK" or anything that sounds like it. If this is adhered to, to the letter, we all will know when to call each other, and "SK" will start to mean something definite.

ATLANTIC DIVISION

E. B. Duvall, Mgr.

A change has come over the division this month, so that the D.M. has to keep on the job clearing each days mail. As a new D.M., it is his wish that hearty thanks are given to those who so came forward and gave such assistance and cooperation in bringing the division back to normal, for it is believed that when this report is published, things will be going full force—everyone satisfied, and everything ship-shape.

NEW YORK—A.D.M. Taylor has done well in reorganizing the New York districts. He has made new appointments for districts that have never had League representation and he and his entire personnel must be congratulated: Dist. No. 6: D.S. Mr. Carl Rossback represents the counties Hamilton, Fulton and Saratoga. Dist. No. 7 includes the counties of Clinton, Essex, Warren and Franklin. Dist. No. 8 D.S. Mr. O. H. Miller represents the counties of Otsego, Delaware, Schoharoie, Montgomery and Herkimer. Dist. No. 9, D.S. Mr. J L. Stiles represents the counties of St. Lawrence, Jefferson and Lewis Dist. No. 10, D.S. Mr. J. A. Fitch represents the counties of Oswego Onondaga, Oneida and Madison. Dist. No. 11, D.S. Mr. T. J. Tappan represents the counties of Courtland, Chenango, Tioga and Broome. Dist. No. 12, D.S. Mr. W. E. Bostwick represents the counties of Wayne,

Thompkins, Cayuga and Seneca. Dist. No. 13, D.S. Mr. J. J. Young, 8HJ, represents the counties of Steuben, Schuyler and Chemung. Dist. No. 14, D.S. Mr. S. Nelson, represents the counties of Ontario, Yates, Livingston and Monroe. Dist. No. 15, D.S. Mr. R. A. Trago represents the counties of Erie, Niagara, Genesee, Orleans and Wyoming. Dist. No. 16, D.S. Mr. R. C. Fosberg represents the counties of Allegany, Cataragus and Chautauqua.

This leaves the seventh district without representation. Any real live ham who is a member of the League in good standing desiring to get this district in shape may receive more information by writing to the A.D.M., 8PJ, at Buffalo, N. Y. O.R.S's in these districts should report to their C.M's and D.S's not later than the 16th of each month and the C.M's and D.S's should report to the A.D.M. not later than the 20th of the month. 8ACM had a job capturing sigs during the eclipse tests, also quite a bit of traveling and checking up reports on the tests. He handled over 100 messages besides having charge of tests for Dr. Pickard. Nelson worked Europe 24 times in the past month. 8CYI has worked New Zealand. 8BZU is C.M. for Rome, N. Y. 8BSF often works the 7th. 8RV handled over 600 messages with 8BLC during the show held some time ago. He has added an OW to his staff and EW is her sign. 18 messages this month. 8DLP, the low-power king, worked all but the 6th and 7th districts on a 201A. 8ADE was heard in England. 8HJ and 8VW have good reports. 8AWA worked the west coast in daylight. 8AGW works the west coast nightly. 8DSM reports NIL. 8ADG comes through with 9.

Traffic: 8ACM, 283; 8ADM, 10; 8AGW, 12; 8ANJ, 37; 8CTK, 14; 8ADE, 2; 8ABN, 5; 8CYI, 10; 8PJ, 8; 8QB, 4; 8DPL, 10; 8ADG, 9; 8VO, 4. 8HJ, 86; 8VW, 24.

NEW JERSEY—A.D.M. Densham, is another fast worker. Raser is now D.S. of New Jersey Dist. No. 6. 3OQ is D.S. of New Jersey Dist. No. 7. At a hamfest at WOAX-3XAN, a good bunch turned out and plans for the coming season were considered. 2CBX has been appointed C.M. of Trenton. 3OQ has worked many foreigners this month. 3AIH worked NOLL with a CG-1162 tube. 3OE is on 86 meters.

Traffic: 3XAN, 7; 3ZI, 6; 3BRM, 5; 3OE, 21; 3ACQ, 2; 3AIH, 7; 3BWJ, 12; 3WB, 17; 3BAY, 10; 3BEI, 3, 3AS, 46; 3BCO, 32.

DELAWARE—3AIS has a small territory but he is a real live wire. He thinks seriously of going back to 180 to dig up some live traffic, as the DX Europe craze has taken his state by storm. 3WJ has returned from Italy. He has been pounding brass on the SS Edgehill. 3AUN has two transmitters but has been busy. 3SL has a fine station but no time to operate. 3BSS has been working England and France every night with two 5 watters. Any stations in Delaware should get in touch with the A.D.M. to put the state on the map. Re-construction has begun in Maryland. More about the new activity when we get the dope. Applications for O.R.S. should be made to the A.D.M. Appointments will be made as fast as possible. 3PU is a new comer on 70 meters. Operators here are 1DE, 8CDC and ex-8AEX. Only in operating since January 15, but have been QSO 6XAD and reporting 90 messages. FB!! 3AJD is still working foreign stations. 3LL reports working 11MT. 3 MF, 3SF, 3TE and 3AHA are putting fine sigs across the pond, being regularly QSO G and F stations. 3TE and 3AHA are heard in N.Z. 3 LG kicks out well on 80 and as 3BVD, puts out mean sigs on 160 meters. 3WF has been reported in England on voice. 3PH keeps up the usual work on 160. 3QI and 3AAM are reaching out on 160, also 3APT, 3AJO, 3DQ, 3CGC, 3CDU, 3UZ and 3FB-3DB are on occasionally doing good DX. 3ER has been reported in Rotterdam using a 5 watter with 400 on the pan. 3SP and 3FF are on the job too. 3BUR has been appointed O.R.S.—is on 80, and will QSR Annapolis traffic. 3 APV reports working foreigners from his station now. He hears lots on 20 meters, but can't connect on the low wave. 3KU is on the job and stepping out better. Laurel boasts a good station in 3BML. 3DW keeps a regular schedule with 3HG Sundays.

Traffic: 3OU, 90; 3LL, 18; 3HG, 12; 3LG, 10; 3BUR, 6; 3KU, 8; 3APV, 12, and 3DW, 2.

DISTRICT OF COLUMBIA—A.D.M. Goodall reports little change. A few new O.R.S. certificates have been granted. There are always at least two or three stations to be found between 150 and 200 meters. 3BHV has a walloping signal and is noted for his exceptional DX. 3JO has recently become an O.R.S. and deserves it. 3BPP comes through with an O.R.S. also. 3BWT, with his 10 operators, is stepping out fine. 3HS and 3TY report combining and erecting a better 3HS. 3AB has a Mercury arc rectifier.

Traffic: 3BBP, 4; 3BSB, 3; 3BWT, 18; 3PZ, 1; 3AB, 10.

EASTERN PENNSYLVANIA—The Eastern Pennsylvania Districts are all set in excellent shape though reports are not getting through. 3QT at Parksburg handled 56.

EASTERN PENNSYLVANIA—3ZM, 7; 3BNU, 39; 3BLP, 30; 3AVL, 11; 3BUV, 10; 3LK, 6; 3ADP, 42; 3BAQ, 3; 3CJN, 5; 3MQ, 17; 3TP, 30; 3UE, 2; 3AUV, 19; 3BVA, 102; 3CCU, 25; 3EU, 20; 3BFE, 12; 3AOL, 16; 3CMT, 10; 3BPN, 12; 3AWA, 42; 3HD, 16; 3FS, 8; 3BCT, 7.

WESTERN PENNSYLVANIA—Activities show that Wiggin's territory is wide awake. Re-organization is under way with some changes in his personnel. 8CEO has been appointed D.S. of the 9th district. Regular press was handled by 8BHJ in preparation for the convention of the Tri-State Radio Amateurs. Interest is reviving in R.R. work and several stations have been active in the district. 8AGO has the largest traffic total this month. 8VE says he has quit the game. He did good DX last month. 8JQ is getting out to Europe. 8BHJ has remodeled his station and is working the west coast. He hopes to tie up with Europeans soon. 8SF is experimenting on low waves. 8AYW has rebuilt and is active.

Dist. No. 10: 8AUD is getting out FB on fone. 8BYI is getting out fairly well. 8BRB shot another five but still going strong. 8BYZ is handling traffic fine and getting out well. 8CBH expects to be back on soon.

Dist. No. 11: The only report was received from 8DNI.

Dist. No. 12: Every station in Erie is on low waves. 8XC-8GO works sixes at noon on 20 meters. FB.

Dist. No. 14: 8CWW was heard in England on 80 meters. 8BJV has been off for a few weeks but has rebuilt using new and better apparatus. QRH 78.5 meters. 8ADS is back and QSO England. QRH 78. meters. 8BGG is on the 75-80 band and getting out well. 8BRM is using 81 meters in daytime and 154 at night. He wants schedules with other O.R.S. 8DKS is full of pep and works on 178 meters. 8BBP is on 78 meters. 8BJA, on 178, is holding the record for his territory. 8CHC is running the mill in O.R.S. style. His good work is known all over the section. 8DBL has junk enough to build a B/C station. 8DCV on 176 meters is another of our new stations. His traffic handling is FB!

Traffic: 8CEO, 30. 8QD, 82; 8BJT, 26; 8DKI, 24; 8AGO, 36; 8VE, 23; 8JQ, 10; 8BHJ, 8; 8SF, 4; 8AYW, 2; 8BRB, 14; 8BYZ, 9; 8BYI, 22; 8ADS, 2; 8BJV, 12; 8ABS, 38; 8BGG, 4; 8BRM, 6; 8DKS, 8; 8BBP, 3; 8BJA, 52; 8DBL, 83; 8DCV, 12.

CENTRAL DIVISION

R. H. G. Mathews, Mgr.

INDIANA—Dist. No. 1: 9AKO has been straightening out a B.C.L.—Ham squabble through the newspapers. (FB, Barney!—D.M.) 9DBJ just got down to short waves and likes it FB as he has worked three new O.R.S. at Ft. Wayne, 9EHU, 9AXL and three different stations on the west coast. There are 9BKJ. 9BYI has returned from a brief absence. 9CXG has a very good record which he is backing up with a nice little message report. He is QRV every A. M. from 3 to 5. 9DRS has the 80 meter bug. 9CAP says DS is good as ever, and 20 meters will be next. 9APD has not received his tubes yet. 9CLN is working in the Laboratory this month. 9AZA is now working on 40 meters. 9AUC worked 175 stations this month—all on a 5 watter.

Dist. No. 2: 9DYT leads the list with ten. 9BK is active but QRW with business. 9BPT sold his set to 9EFZ and EFZ worked NZ and Australia. 9DHJ works all but 6's and 7's with a 5 watter. 9CP got the 250 oscillating fine down to 18.7 meters. 9PB is on 78 meters but is having trouble. 9EM took a commercial exam. 9BON is going to move. All stations in South Bend are on or below 80 meters. 9OG, ex-9CTE, has his 250 perking down there. 9CCL, ex-9BBI, is QRW in a radio store. 9DKT has 4

fivers on 20 and works Denver in daylight. 9AIL, using a 201A works a thousand miles. 9AKD works all districts with ease. 9BBJ dropped to 80 and is getting out FB with his 50 watter. He has an 85 ft. steel mast. 9CUB and 9BO are ops at WGAZ. They want to put the station on 80 meters. (Hi!—D.S.)

Dist. No. 4: 9EJI is getting out FB on 80. His traffic total is bigger this time. 9BVZ is working the west coast consistently. 9BJL worked A2YG. 9ADK is QSO west coast consistently. 9AUW is geting out FB on 80 meters. 9AXH is working on 200 meters, with a fiver. 9AUD gets out good and handles traffic. 9BJR turned in a good report. 9BCC was home and worked fine DX. 9VC is pounding through FB. 9CJA is banging away FB. 9PB is QSO west coast. 9ARP handles traffic. 9CYQ is raising them all. 9AUP is chasing interference for the gang. (FB, OM!) 9CUR was on and worked a few. 9DTL is on the short waves. 9BIW says too much QRM down below. (Try 40, OM—D.S.)

Dist. No. 5: 9CCI leads this month. 9BDB and 9PD have spark and C.W. also.

Traffic: 9EHU, 64; 9BJL, 37; 9DBJ, 35; 9CCI, 32; 9EJI, 30; 9BKJ, 27; 9BYI, 27; 9ARP, 25; 9CSC, 24; 9DDZ, 23; 9AUD, 20; 9BJR, 17; 9DBJ, 17; 9CAP, 15; 9CEM, 15; 9CXG, 14; 9TG, 14; 9DPJ, 14; 9ES, 10; 9BK, 10; 9DYT, 10; 9BIW, 9; 9ABP, 8; 9AEB, 7; 9EEY, 7; 9BK, 7; 9BYI, 7; 9DRS, 6; 9BPT, 6; 9DHJ, 6; 9CP, 5; 9BDB, 5; 9CSG, 5; 9AXH, 5; 9ADK, 4; 9PD, 4; 9EFZ, 4; 9BVI, 3; 9ARX, 3; 9CLN, 3; 9AZX, 2; 9FB, 2; 9EM, 2; 9AUW, 1; 9BDB, 4; 9PD, 2.

OHIO—Dist. No. 1: 8BCF has a Meissner circuit on 85 meters. 8AGP is getting out on 150 meters. 8ER has worked England. 8GD is still hammering away. 8CQA is on 78 meters. He has the makings of a fine operator. 8DOX uses 25 cycles with a 5 watter. 8CCI has worked the west coast with his harmonic. 8AA put one message direct to G2JF. 8BN sends in a good message report. 8BO is getting going. 8IO is down because his tubes were stolen. 8FU is using AC plate supply. 8BQI is still above 150 meters. 8DCB has joined the low wave hams. 8DND has a new commercial license and a new station. 8BRU is on low waves. He lost his DC note. 8PU is doing good DX.

Dist. No. 2: 8RY has worked G6RY, RCB8 heard 8RY January 25th. 8BCE worked Z2AC and D7BN. 8ZE works many Mexicans and says QRV for traffic. 8AJZ is using a UV201A and is doing well. 8AGS joined us with two 5 watters.

Dist. No. 3: 8ACY has a regular schedule with G2NM. 8BVR logged fourteen countries on one tube. 8ADA can work D7EC besides handling traffic. 8DGP is still plugging away. 8BK and 8AVT are running again. 8BKM is still at it with 5 watts. WJS was logged by 8DRX, 8DQF, 8AWX and 8WR.

Dist. No. 4: 8APR leads this district. 8AHY reports this month. 8ANB has ordered a 2200 volt MG set with an amplifier tube.

Dist. No. 5: 8DO was on part of the month. 8BYN is QSO Europe now and wants foreign and U.S. traffic.

Traffic: 8BYN, 152; 8APR, 89; 8BN, 60; 8AGP, 48; 8FU, 46; 8GD, 40; 8BWB, 37; 8BQI, 37; 8DPK, 36; 8CCI, 36; 8AVT, 36; 8AJZ, 36; 8BHP, 35; 8CVA, 34; 8ZE, 33; 8AHY, 29; 8BOP, 28; 8DBM, 28; 8ARW, 26; 8AOE, 23; 8AA, 21; 8ANB, 20; 8ACY, 20; 8BDK, 20; 8DO, 19; 8AGS, 19; 8DCB, 18; 8AWM, 16; 8RY, 16; 8ER, 15; 8DAE, 15; 8ALW, 15; 8CTA, 10; 8DCP, 9; 8ADA, 9; 8BOQ, 7; 8AIB, 6; 8CNG, 5; 8CNL, 5; 8AWX, 5; 8BCF, 4; 8BKM, 4; 8WE, 3; 8CWR, 2; 8DCF, 2; 8BRU, 1.

MICHIGAN—Daylight tests were partially successful.

The next Michigan state A.R.R.L. Convention will be held in Kalamazoo in 1926.

Dist. No. 1: 8DOO works G6TG. 8AMS says he is QSO north. 8DGO is working on low wave stuff. 8ZH will check audibility and wave-length and stations in his district working off wave will receive a card to that effect.

Dist. No. 2: The Lansing fellows deserve credit for having had a good convention. 8CED, 8DOK, 8CAP, 8MM, 8CCW and 8DCW turn in good totals this month.

Dist. No. 3: Activities are on the jump and the whole gang are on the trail of traffic handling and DX. 8CQG and 8DSE are working out in great shape. 8ADU is C.M. of Kalamazoo. 8DOG has two ops and is QRV from 2 to 4 A.M. C.S.T. on the 200-150 meter band. 8AOR has developed a filtered plate supply at last. FB! The YL's have 8CPD'S plate current up several amperes. 8DFK finds time to jam 2,000 volts on a fiver once in a while. 8CFJ has a fiver that mis-behaves. 8BIC has four B.C.L. aerials between his antenna and counterpoise, but they hear him just the same. 8AFF, 8CQJ and 8APS are new stations QRV for traffic. 8ATO wants schedules on 1 76 meters and on 80 meters. 8AUO wants to QSO Michigan men. 8BUC hands in a report. 8AAL mourns a fifty and he is doing work with fivers now. 8BOK is QSO with a lone fiver. 8MV is experimenting with short waves. 8AGA is operating 9NV in Chicago. Railroad Emergency work was done during recent storms by 8DNK and 8DJH. 8DNK was at the key for 18 hours continuously handling several important msgs for railroads. He uses a thousand volts storage battery for plate supply. 8DOW has a mast 70 ft. high now. 8DMA has a 1400 volt storage battery plate supply. 8DQB has a new antenna. 8AUB kicks out great. 8AZG QRM's the sixes with a 50 watter. 8BCV has stuck at it through local power leaks. 8JG is on short waves and QSO Porto Rico. He uses a UV201A. 9CPY is on 82 meters, operating late each night.

Dist. No. 4: 9EFP, 9AEN, and 9OWI are the only stations reporting.

Traffic: 8CED, 80; 8DOO, 73; 8CPY, 63; 8DSE, 37; 8FY, 30; 8NCN, 30; 8DOK, 28; 8CAP, 26; 8JG, 22; 8BBL, 20; 8MM, 19; 8CCW, 18; 8ZH, 18; 8CQG, 18; 8CCW, 18; 8DCW, 17; 8DAI, 14; 8AUB, 13; 8AAL, 12; 8BD, 12; 8DFS, 9; 8DNK, 8; 8DJH, 8; 8CKL, 8; 8CLG, 8; 8ZZ, 7; 8ZF, 6; 8CEP, 6; 8DOW, 5; 8BXA, 4; 8ACU, 4; 8AMS, 3; 8CWK, 2; 8AKE, 2; 9EFP, 2; 9AEN, 1; 8BGO, 1.

ILLINOIS—Dist. No. 1: 9EIB was heard in England. He is QRV traffic on 80 meters. 9DGA says everything is FB on 85 meters. 9CHT has a good station using DC and 80 meters wave-length. 9AWU is on 80 meters and has a good wave meter at last. FB! 9EIB handles traffic on 80 meters.

Dist. No. 2: 9BRX reports his station working well. 9DXL reports that he has changed to 78 meters. 9ELR works many stations with one 5'er on 196 meters. 9CTF is on 80 meters now. 9BUK burned out a 50 watter. 9ELF rebuilt his set and put up a new aerial. 9ARM worked Texas.

Dist. No. 3: 9AFQ handled a lot but is dropping down with the bunch. 9CSW got his four coil Meissner to perk. 9AWQ reports DX good. 9BYX is back with a one wire antenna.

Dist. No. 5: Stations reporting are 9AYB, 9EBQ, 9BLO and 9BJE, 9BJE is using two UV202 tubes on 76 meters.

Dist. No. 6: 9DVW is putting in another transmitter for 75 meter work. 9DQR is working all districts. 9CDY is ready for short waves when his license comes. 9CEC uses loose coupling now. 9AGW is the new C.M. of Elgin. 9DOU and 9OS have a joint station now. 9BBR is on the low waves. 9EHQ is active as ever. 9AKU is using two UV-203A's for working both coasts. 9CYZ is working out FB with a VT-2 on 80 meters. 9BRE is using capacity coupled circuits.

Dist. No. 7: 9AIO is all set for the brass pounders contest. 9ZA worked G5NN. 9LZ has a daily schedule with 9AAN. 9DWH is one of the mainstays of Chicago. 9DPC hit the bell for the "starred square." 9NV is on 40 meters in the daytime and 80 meters at night. He has a noon schedule with 9XI. 9BNA mounted his new set on plate glass. 9APY has a new 5 watter. 9AHD is on 78 meters. 9BWP was heard in N. Z. and England. 9APK logged a bunch of foreigners. 8BRE is using capacity coupled circuits. 9EEG blew his 50 watter. 9AAW is operating on waves from 40 to 200 meters. 9CBZ is after an O.R.S. appointment.

Traffic: 9DPC, 152; 9BRX, 125; 9LZ, 102; 9DXL, 56; 9BE, 52; 9BNA, 49; 9DVW, 44; 9ZA, 36; 9AIO, 34; 9DQR, 32; 9EIB, 32; 9NV, 28; 9AFQ, 27; 9DWH, 25; 9CVF, 24; 9MC, 24; 9DGA, 24; 9CSW, 21; 9EBQ, 20; 9ELR, 20; 9EIB, 16; 9AAW, 16; 9APY, 14; 9AWQ, 14; 9AYB, 13; 9BJE, 13; 9BYX, 12; 9CTF, 11; 9EHQ, 11; 9CYZ, 11; 9BUK, 10; 9AHJ, 10; 9EAS, 10; 9CHT, 9; 9BWP, 8; 9CDY, 8; 9DWX, 7; 9AHD, 6; 9ELP, 5; 9DZR, 5; 9ADZ, 4; 9AKU, 4; 9QD, 4; 9RQ, 3; 9DNP, 3; 9CVS, 2; 9ARM, 2.

WISCONSIN—Dist. No. 1: 9DTK leads the gang with traffic handling. 9DKC reports better DX work on short waves. 9ELV is still using the same fiver immersed in oil. 9AFZ has trouble with absorption in local power line circuits. 9BKR has his new transmitter going. 9BMV needs a schedule with some Minneapolis station. 9CRA built a new tuner

and retuned his transmitter. 9CII is ready to go with his emergency transmitter. 9NY operates his station more now. 9CVI has schedules with 9BFI and 8ATR. 9ATO is rebuilding his transmitter. 9HW hopes to improve on Heising modulation. 9CIV is back on the air with C.W. (Welcome, OM!) 9DII, with ex-9JI, has a station with 500 cycle plate supply. 9DB has finished rebuilding.

Dist. No. 3: 9BVA reports good DX. 9CIU says the 5 watter is perking fine on 200 meters. 9AEU gets good DX. 9ECK and 9BXS are getting out. 9AFJ and 9EFR are on with C.W. 9DHG is on low waves.

Dist. No. 4: 9AZN has a noon schedule with 9DTK. His traffic report proves that it is desirable to make regular schedules. The local club here is making arrangements to handle citizen traffic. 9AKY is handling morning traffic between here and St. Paul and Minneapolis. 9PJ is on consistently. 9BKC is rebuilding his set for 80 meter work.

Dist. No. 5: 9BKU wants to be an O.R.S. 9BTK is on 175 meters.

Traffic: 9CTK, 207; 9AZN, 161; 9AKY, 48; 9BBY, 44; 9BVA, 33; 9DKC, 32; 9CIU, 26; 9ELV, 23; 9AFZ, 21; 9BKR, 20; 9AEU, 18; 9ADP, 14; 9VD, 14; 9BMV, 13; 9BMU, 11; 9CFX, 11; 9PJ, 10; 9CRA, 10; 9BEK, 10; 9DPR, 7; 9ELI, 7; 9CII, 6; 9DHG, 6; 9NY, 3; 9CVI, 2; 9BSO, 2; 9BKU, 2.

WISCONSIN—Dist. No. 2: 9EK leads this district in traffic handling. 9EK also uses the call 9XH and the same operators. 9EBV, a student at the "U" is doing fine work but is bothered with re-radiated energy on broadcast waves. He welcomes information on how to overcome this difficulty. 9EGH is going strong with his 250 watter. He is trying to QSO foreign stations and is anxious to arrange tests. Operating hours are 4 to 6 A.M. Saturday mornings. 9DZV is on nearly every evening at 7 P.M. using C.W. and fone. He also operates at 9EK. 9COI, at Madison, is working on 80 and 40 meters. 9DVB had the mumps. 9CND, ex-9BBV, is on 80 meters whenever he can keep the rectifier thawed out. 9AKR is building an elaborate station. 9BMY works at 9EK and operates his own station when not at 9EK. 9CCF works one night at 9EK. Now is experimenting on low waves. 9OM is now on 80 meters. 9EAR is strong for the short waves. He worked Mexico and his monthly report is full of Spanish. He is using a lone fiver. 9CWZ reports QRM bad in his locality. He would like an appointment as emergency station. Applications for emergency station work must be made to C. N. Crapo, 9VD, Milwaukee, Wisc., giving qualifications. 9DUJ has been doing some fine work. 9AZA has been trying fone on the short waves. He blew a fifty, which knocked the C.W. transmitter out of balance.

Please send in reports on the emergency tests sent from 9VD each Sunday at 9:30 A. M. on 75 meters and at 9:40 A. M. on 150 meters.

Traffic: 9EK, 89; 9DUI, 54; 9CWZ, 43; 9EBV, 22; 9EAR, 20; 9DZV, 116; 9EGH, 9; 9BMY, 6; 9OM, 1.

KENTUCKY—Dist. No. 1: 9TIP is on regularly doing good work. 9ELL is working good DX dropping bombs in Europe too. 9DTT and 9CVR use four 5 watters on 80 meters. 9DWZ works both coasts with four fives on 175 meters. 9DYC is back on the air. 9OX is using a UV201A on 80 meters and working real DX.

Traffic: 9HP, 73; 9ELL, 7; 9MN, 8; 9WU, 5; 9DYC, 1; 9DWZ, 22; 9OX, 3.

DAKOTA DIVISION
D. C. Wallace, Mgr.

One of the outstanding events of the month is the South Dakota Convention, held at Huron, South Dakota. 40 live amateurs were present and for two days everything ran along smoothly with the talks, traffic meetings and final banquet, together with Wouff Hong initiation.

North Dakota is undergoing reorganization under M. L. Monson, 9CSI, the new A.D.M. Mr. Monson is at present conducting an election for the new district superintendent for district No. 1, which will be announced shortly.

SOUTH DAKOTA—Dist. No. 1: 9XBP is doing fine work and has the best report. Ten ops on the job shove the traffic through. 9CKA it at college, but finds time for a little work.

Dist. No. 2: 9AGL worked Australia three times. 9CJS works England through the evening QRM but not much else. 9CGA is getting out with a fiver. 9DBZ handles most of the traffic. 9DKL is getting back into his stride and going good on 80. 9DXR has applied for O.R.S. 9CKD will try out the shorter waves.

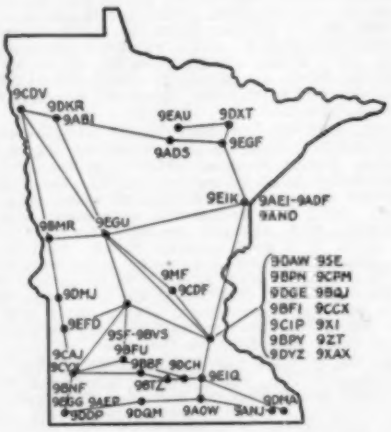
Traffic: 9DBZ, 42; 9ABY, 5; 9CGA, 3; 9CKA, 8; 9CJS, 27; 9XBP, 82; 9AGL, 25.

NORTH DAKOTA—A general reorganization is taking place. 9DTQ is a new O.R.S. in this district. 9CRG is experimenting on 80 meters.

Traffic: 9CSI, 2; 9CRG, 7; 9BQF, 7.

MINNESOTA—Daylight routes have been laid out throughout the state, the most of the fellows responding beautifully. These routes are ready for emergency traffic.

Dist. No. 1: A raid is being made on "dead" O. R.S. 9CWN, 9DKR and 9ADS are new O.R.S., and prospects are FB for several more. 9AYQ and 9DKR are doing good work. 9BMR is developing a first-class station. 9CWN is doing excellent work on the 1500200 meter band. 9CDV sends a small report this month. 9BAV reports QRM from power line leaks. 9EGF is still on high waves. 9CMS has S tubes coming. 9AEI is there with pep and spirit of co-operation. He will have several new O.R.S. in Duluth soon. 9ADF is on 80 meters with 100 watts.



MINNESOTA TRAFFIC MAP

9AND lost his 50 watter and mast. Lady Luck is with him and he is getting good DX on a 50 with a new 65 ft. mast. 9EGU is working out consistently and has added A2BK and Costa Rican "SJ" to his laurels.

Traffic: 9CWN, 53; 9EGU, 53; 9AYQ, 44; 9CDV, 23; 9AEI, 18; 9ADF, 14; 9BMR, 12; 9AND, 9; 9DKR, 8.

Dist. No. 2: 9DDP, 9BZJ, 9EBC, 9COF, 9DCH, 9CYX, 9SW, 9BTZ, 9CAJ, 9EFD and 9CPO are on daylight routes. 9MB keeps a regular watch for traffic during the sunset and sunrise hours. Many stations can only be in operation during the week-ends. Every station is ready for use in case of emergency. 9AXS blew his five watters but managed to work Australia after securing replacements. 9ANJ is away during the week and the O.W. operates in his absence. FB!

Traffic: 9AXS, 31; 9CYX, 30; 9DCH, 27; 9CPO, 27; 9SW, 26; 9CAJ, 21; 9MB, 16; 9BYY, 13; 9EFD, 11; 9EBC, 10; 9COF, 9; 9BTZ, 8; 9DDP, 6; 9MF, 6; 9BFU, 1.

Dist. No. 3: 9ZT continues to work foreign stations consistently. 9XI is keeping noon schedules on 80, 40, and 20 meters, working both coasts at noon, with the shorter wave. 9DX will be going soon. 9DPX and 9DAW are on consistently working foreign.

Traffic: 9BPN, 192; 9ABK, 102; 9XI, 68; 9DGE, 56; 9SE, 47; 9CPM, 40; 9DPX, 20; 9SE, 38; 9APE, 35; 9DEV, 34; 9DYZ, 25; 9BOB, 22; 9DAW, 12; 9DEQ, 10; 9BPY, 8; 9PH, 7; 9BMX, 6; 9ASW, 4; 9CCX, 4; 9DWO, 3; 9ZT-9XAX, 33.

DELTA DIVISION
B. F. Painter, Mgr.

The Delta division has passed into new management with this month.

TENNESSEE — 5DA reports that he resigned as A.D.M. for Tennessee sometime ago, due to press of business, but states that he hopes to be back on the air shortly. We are going to forget his resignation as we have never seen it. The D.M. stopped in Knoxville and saw May and Adcock. May is on 80 meters and Adcock will be there shortly. 5AVJ has a 50 watter and Grimshaw at the key. 5AMF is dropping down to the low waves, but hates to lose the beautiful antenna. 5AQR is opening a station on 80 meters. 5XAT will be back on all waves shortly. 5ABD has worked his wave down well below 20 meters. 5HL and 5LU are daily receiving cards from all over the world. 5ANT, 5AJM and 5AFF are rebuilding.

LOUISIANA — 5KC reports traffic and also that he has worked Morocco AIN in North Africa, besides England, France and New Zealand. We can always depend on him for a good report.

The D.M. desires to increase the membership, increase the traffic total and increase the Delto Division representation in QST. If the membership will make reports to their local officers on time, I assure you we will see that it gets in QST. If you don't know who your local officers are, write me. The A. D.M's are instructed to take charge of their states and get things going. If they need help, ask for it. Mississippi is without an A.D.M., and the D.M. will appreciate recommendations for the office.

Traffic: 5KC, 20.

HUDSON DIVISION

E. M. Glaser, Mgr.

Traffic is heaviest on the higher waves because there is less QRM there. Many stations have gone up there to handle traffic. Delivery is more reliable now. Stations are requested to report the number of messages delivered, as well as those received by fone, mail, or in person.

Complaints of QRM from Troy and Hudson came in and were investigated by 2ANM and 2AGM, respectively. All amateurs are urged to co-operate with their neighbors as much as possible, to eliminate all kinds of amateur interference. Because you operate on 85 meters doesn't mean that you can transmit any time of the day or night. You MUST BE SURE THAT YOU ARE INTERFERING WITH NONE. Get rid of your key clicks and the rest is comparatively easy. Transmitters on 40 meters or lower cause very little QRM. Try 40 during the quiet hours. It works very FB! Traffic officers will please notify the D.M. after any O.R.S. has missed two reports and request cancellation if they miss three in succession or a total of five. Do not be too hasty in requesting an appointment. Just because a fellow seems very enthusiastic over traffic, don't request his appointment. Wait a little while and see if he cools off or means business. Be careful in your requests!

2CYX is the most active station in the vicinity. He is also experimenting on 40. FB, Marty! 2BBX is busy with college, but the second op keeps things going. 2CEI is getting across. 2CVU is doing fine on a 201. 2CVL reports little activity. 2CWR is getting along well. 2SM is a new man to report. 2PE manages to get on once in a while. 2CTY is on often working Europeans and to traffic totals. 2WC gets on occasionally. 2AAY and 2WZ are doing excellent work, but the sink is still broad. 2ABR has no luck on 80. 2EQ reports ok. 2BRB is taking it easy. Other QRM? However, the cards haven't stopped arriving! 2CLA has worked 1IMT. 2CHK continues his excellent work to Europe and the west. 2BNL is making a big hole in the air around N.Y.C. 2LD raised his mast again. After working two Englishmen, 2CPK's generator departed from its E.M.F. 2KR works on 75 and 150 simultaneously. Have you a little harmonic? Hi! 2CZR has worked 8 sixes and sevens this season. 2XNA has been blowing fuses quite regularly during experiments. 2BQU is QSO all over Europe for traffic. 2CEP worked four Englishmen in a night. 2CIS is in line for an O.R.S. 2EB is building a 5 meter set with 2CLF and 2CKT. FB! 2BSL is the only traffic station in Queens. 2RB is working DX.

Traffic: 2BBX, 22; 2CEI, 12; 2CVU, 10; 2CVL, 4; 2CWR, 6; 2CYX, 51; 2SM, 20; 2CTY, 20-d3; 2WC, 8; 2EQ, 10-d1; 2AAY, 16-d2; 2WZ, 13; 2PF, 1; 2BRB, 20-d2; 2CHY, 9-d9; 2CHK, 18; 2CZR, 17; 2CSH, 6; 2BNL, 6; 2LD, 22; 2CPK, 9; 2LA, 8; 2KR, 19; 2BQU, 20-d1; 2CEP, 31-d2; 2BSL, 7.

EASTERN NEW YORK—Dist. No. 1: The stations are all doing good work though traffic is not heavy. 2AV, 2KX and 2BPB are all going strong. 2CLG has opened up and the D.S. expects to make him an O.R.S. soon.

Dist. No. 2: The new D.S. is getting things in fine shape here. 2AAN worked a half dozen G's and the same number of west coast stations, using a five watter with 50 watts input. 2AG has a schedule with WJS in Brazil. He has been handling dozens of real msgs. He has a 500 watt M.O. set and is QSO every place that has a short wave receiver. 2APY blew his five watter after working a dozen foreigners, on an input of 25 watts. 2AHB handled several messages on 150 meters. 2CIL has been having trouble with his plate supply. He is off temporarily saving up for a new bottle. 2BQB has QSYD'd down to 80 and worked across several times. 2DD has 2ADH's panel set with a Telefunken bottle. The first station worked was NONL. 2DD promises to be a good traffic station week-ends. 2CBG has had his share of DX and has also blown a fifty. N.Z. is his latest catch. 2ADD has resigend as C.M. 2AJQ is in line for an O.R.S. as soon as he gets back on. 2AAC has been on 20 and 40 meters and reported heard in France on an "E" tube. 2AQH has worked forty sixes and lots of foreigners on a 50 watter.

Dist. No. 3: Activity is increasing. 3BM is an old timer and new O.R.S. He is a reliable op. and handles a good bunch of traffic. 2CTH moved to Troy. 2CDH is busy with his chickens (feathered ones), but has been giving the 80 meter stuff a try. 2AGM had a run-in with B.C.L's, but as everything was ok at AGM's he is not closed down. 2SZ came down to 80 and was QSO England at once. 2ANM is QSO Europe and handling a good bunch of traffic.

Dist. No. 4: 2CYM sent in a nice report. 2CNP handled quite a few msgs. He is on 80 meters. 2AQR has gone down on 80 meters. 2CXG says traffic is scarce. 2AGQ thinks 80 meters is great, as he works such good DX and receives such good reports. 2CGH as usual takes the traffic honors this month. He is so ambitious for traffic that he threw away the chance of doing real DX on 80 and went back to 150 meters. 2AWF says traffic picked up a bit, due to some daylight brass-pounding. He works England and France almost every evening. 2PV is working all over the map with a lone fiver. 2BY has worked N.Z. and Australia as much as any station in the country. He had a schedule with A2DS and A2YI and didn't miss out for over a week. Shoot ur foreign traffic hr., O.M's. 2 GK is QSO Europe nightly. 2ACS is having lots of fun working Europe and handling a nice bunch of traffic. 2CPA has worked lots of 6's and 7's. He is just aching to get QSO Europe. 2AIF at last got going.

Traffic: 2AV, 69; 2KX, 3; 2BPB, 1; 2AAN, 9; 2DD, 11; 2CDH, 110-m10; 2AGM, 53-d2, m4; 2SZ, 16-d1; 2CTH, 5-m1; 2ANM, 25-m2; 2CNP, 22; 2AQR, 61; 2CXG, 14; 2CYM, 38-d2; 2AQG, 112-d3; 2CGH, 69; 2ACS, 54; 2CPA, 48; 2BY, 37; 2AWF, 24; 2PV, 1; 2GK, 3.

NORTHERN NEW JERSEY — We are satisfied that our sets stop out and we should now turn our attention to handling messages.

Dist. No. 1: This district leads again with traffic reports. Credit must be given to 2AJF for his very fine work. 2CJX leads with traffic handling. 2AJA is still operating week-ends. 2CGB has been appointed O.R.S. and reports working European countries. 2ARB has been appointed C.M. of Clifton.

Dist. No. 2: 2WR has been appointed an O.B.S. for 75 meters. A 250 watter will be used for this work. 2AXF is QSO Europe and South America. 2EY is on 80 meters with a fifty watter. 2BXD is down, due to the loss of a mast. 2AHO reports good work with Europe. 2BAW has been off temporarily. 2CDR has installed a new rectifier and made several minor changes. 2CRP is on the job and has two transmitters in operation, one for 80 meters and the other for 150 meters local work. 2AFC will be recommended for an O.R.S.

Dist. No. 3: 2AMB is back after a long silence. 2QS complains no traffic and too much chasing DX. 2BGO has a new 50 watter and expects to be on regularly again. 2ACO and 2COZ remain on the higher waves. 2BQC has distinguished himself by working WJS and taking a few press msgs.

Dist. No. 4: 2FC has rounded up his whole district and had them all report. His DX list is growing larger and he requests more traffic. 2CXY has worked most every European country with low power. 2BUY is receiving cards from Europe but can't seem to QSO. 2CPD has returned to higher waves and has larger traffic total. 2BZJ has slipped down to 80 and reports DX great. 2AUH has two trans-

mitters going. 2BGI was heard in India and continues to QSO N.Z., which is FB.

Traffic: 2WR, 25-d2; 2AXF, 15-d2; 2CGB, 19; 2ATE, 8; 2AJA, 16; 2CJX-d2; 2AWT, 4; 2AJF, 8; 2ARB, 8; 2CXE, 2; 2AT, 59-d2; 2CTQ, 28-d2; 2BXD, 7-d2; 2BW, 16-d1; 2BAW, 17-d1; 2CDR, 4; 2CRP, 28-d6; 2ACO, 14-d1; 2AMB, 15; 2AZY, 10; 2CQZ, 8; 2CRW, 8; 2QS, 8-d2; 2BQC, 17; 2BJZ, 30; 2CPD, 4; 2CXY, 37; 2BUY, 17; 2AUH, 33; 2BGI, 14; 2FC, 6; 2CGK, 1.

MIDWEST DIVISION
P. H. Quinby, Mgr.

MISSOURI—Dist. No. 1: 9CEE and 9BLG have both quit the game. 9DLB has a commercial ticket. FB. 9DMJ reports working foreign stations and he has a good traffic report. He has a sync. rectifier which is well-filtered. 9AAU is no more. The call, 9ZK, is used instead, with 9DS for the portable call. He handled a number of P.R.R. msgs. during the recent storm. 9BEQ has a 50 watter going and a 250 coming. 9BEQ has done much good work in the past three months. 9BSH is being rebuilt into a station DeLuxe. 9EEH promises to develop into a good station. With 90 V. B. Bats. he worked several 3's. He is a Morse operator. 9BRU handled his part of traffic and blew his 5 watter. 9DWK has been on but devoting his time to experimenting.

The Webster Groves and Maplewood stations are asking for a C.M.

Donald McMillan gave his lecture at Cape Girardeau. He expressed his appreciation for the work of the League and for the American amateur.

Dist. No. 2: 9AOB reports various activities. 9EGS had to leave town on business. 9DJI is a new station. 9CUU is building a super station. 9CRM got a new bottle and has been on regularly as his traffic report shows. 9DOO fell down on traffic when two fivers quit him. 9ADC is reported back on the air after a long absence. 9DIX continues his DX working. 9DEU and 9DNO come on at times. 9EAO is active on 80 meters but his best bet is 150. 9CYK kicks about rotten WX, but works both coasts. (Read the TOM rotten articles in ye old time QST, OM). 9RT was logged twice in S.A. on 80 watts input. 9CKS was logged by CBS. The D.S. gets home weekends, but is trying to assemble a transmitter in town. K.C. stations handle all the traffic they can without getting fired or expelled from school due to sleeping days. 9ELT is a new station on for traffic. 9BKK is on the trail of more 50 watters. The old ones all quit. 9ACX got on again after moving. 9ACX was caught listening to broadcast. 9RR has been away on a trip. The first thunderstorm of the year hit KC the 22nd. QRN will be with us from now on.

Traffic: 9ZK, 64; 9DMJ, 43; 9DXN, 30; 9DLB, 23; 9REQ, 22; 9BRU, 21; 9DWK, 6; 9CRM, 117; 9DOO, 12, 9DAD, 20; 9BVK, 71; 9AYK, 17, 9CKS, 5; 9CYK, 35; 9EAO, 6; 9DIX, 15; 9RT, 34; 9AJD, 20; 9DAE, 13; 9CDO, 6; 9BKK, 23; 9RR, 21; 9ADR, 9; 9AYL, 6; 9ELZ, 12; 9BDZ, 8; 9ZD, 11; 9ELT, 6; 9ACX, 4.

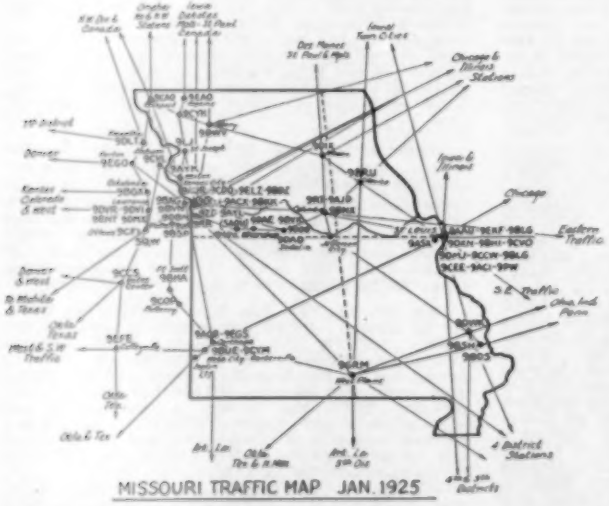
IOWA—Traffic has picked up during the last month. 9AVJ has schedules on several different waves. He worked England. 9CAV reports. 9DAU reports that his tube went west. 9DJA reports that his fiver is working better. 9HK reports having worked 6CMQ in daylight on a wave of 75-80 meters. 9ON reports a good message total. His traffic is through N. Y., California, Louisiana, Texas, and east coast. 9BWC and 9BAQ are working on 80 meters. 9CXX is experimenting on 20 and 40 meters and has a schedule with 1XAM. 9AXD is now down on 80 meters. The C.W. at 9CS is still slowly being built. 9DEX is a new O.R.S. and made a fine report. 9DMS is having trouble with the B.C.L's. 9BVK is another new O.R.S. and is getting out nicely using two 201A's. C.M. of Des Moines reports that the gang is coming to life again. The Capitol City Radio Club had a meeting of amateurs and succeeded in turning out 20 hams. 9BRS is now back on the air with 5 and 50 watts, S tube rectification and new low loss wave installation throughout. 9BPF was off part of the month on account of losing one of his bottles. 9BPF is said to be the most deserving O.R.S. of Des Moines. FB! After working New Zealand several times, 9CLQ decided his set was working right so is again rebuilding it. Hi! 9DIP still continues to shove through traffic. 9APM is quite dependable when he is on the air.

I wish to announce an Iowa Radio Convention, which will be held April 17th and 18th at Ames, Iowa. Speakers and other particulars will be announced later.—A.D.M.

Traffic: 9BAQ, 5; 9ON, 63; 9HK, 15; 9AJA, 12; 9CHN, 6; 9DQU, 6; 9AVJ, 186; 9CS, 11; 9BGH, 50; 9BPF, 40; 9DMS, 30; 9BEW, 66; 9CZC, 30; 9DDK, 5; 9CLQ, 3; 9APM, 4; 9DIP, 10; 9DEX, 77; 9BKV, 75; 9CZO, 47.

NEBRASKA—Dist. No. 1: Traffic seems to be very low in proportion to the number of stations active but this is partly due to the fact that practically all stations in this district are on one of the low bands where the scarcity of traffic is very noticeable.

9EGA is getting very good DX and is doing considerable experimenting on 40 and 20 meters. 9BNU is on very little. 9DPS, the new O. R. S. at Grand Island sure has some "wallop." 9CGS says everybody on 80 meters now makes DX very good on the 150-200 band. 9CJT has been on regularly.



MISSOURI TRAFFIC MAP JAN. 1925

Dist. No. 2: Dist. Supt. reports considerable activity and increase in traffic. All stations report that traffic is scarce on the low waves. 9AFR and 9CBK have consolidated. 9BDU is doing some good DX. The Nebraska Buick Auto Co. Station KFAB will be operating a transmitter between 75 and 80 meters during the broadcasting hours. It will be announced from the Studio that this is being done and requesting listeners in to 'fone their applause messages to the nearest amateur transmitter who will forward them to the station on the 75 to 80 meter range. "Gang" this is a chance to show the B.C.L.'s what we are doing. To have their name read over radio that has gone through the hands of an amateur transmitter. Don't you think that it will be a boost? Well then let us get behind it and show 'em we can do things. We use call 9ANF. I think that this covers the ground pretty well, OM, and I would sure like to hear what you think of the plan. Rather new and novel 'eh? Will also boost traffic report for the Midwest and with Msgs that means something.

9EAK put in a big tube and reports working G2ZO. FB! 9EHW is on regular. 9AKS is first with 72 messages this month, working DX with 10 watts.

Traffic: 9AKS, 72; 9DAC, 42; 9DQC, 24; 9EHW, 19; 9BOQ, 17; 9EEO, 15; 9EAK, 13; 9PN, 9; 9CGQ, 3; 9EGA, 42; 9DPS, 7; 9CJT, 8; 9DUO, 17; 9DXY, 41; 9EB, 14.

KANSAS—Traffic and interest seem to be lagging this month. The few nights of QRN slowed us up a bit. However, our Star station 9CFI kept pounding the brass. He has worked Z2AC, Z4AK and A2YI with a bunch of cards from all over. He also received a report from the Philippine Islands. The Kansas City gang have slowed up on account of 9DLM

quitting the game. (We've heard of it before—it's no use.) 9CKM has a fiver sweating while 9DMZ makes an AMP tube punch out sigs. 9BXG moved a good share of the traffic. 9CUL worked Mexico and lot of U.S. DX. 9BGX finally came down to 80. He worked Canada and Mexico the first night on and is QSO east coast in daylight. At Lawrence the gang is busy with school but 9AOD and 9EHT are on. The losing of a fifty made 9DNG feel lost but now he is back fixing up a new 50 with S tubes. 9QW has new S tubes but lost two fivers. 9CEA is doing some very good DX work. His DX now includes Alaska, England, Australia and New Zealand. 9BLB, a new O.R.S. is also op at the Emporia College station 9DPO. On his own set he is QSO all districts on a fiver. 9CCS and the B.C.L's can't agree so now he QRT's between 8 and 10:30. He reports hearing a few foreign stations but not QSO DX. 9AIM blew his 250. He's using a 50 again. The gang reports Z2AC the best DX station heard. 9DHW, on that swell D.C. set, was heard 3000 miles west of Frisco. Thats FB. Two new O.R.S. are 9BLB and 9ACQ, both doing fine work.

Traffic: 9BLB, 25; 9AIM, 7; 9BRD, 11; 9BXG, 2; 9DLM, 20; 9AOD, 6; 9ACQ, 11; 9CEA, 24; 9BIO, 1; 9CCS, 10; 9EHT, 5; 9QW, 4; 9AEP, 15; 9DHW, 12; 9BVN, 80; 9CVL, 16; 9CFL 76; 9DNG, 14; 9DLT, 78.

NEW ENGLAND DIVISION
I. Vermilya, Mgr.

VERMONT—This month we have a new D.S. for the first district, 1BDX. 1AC is now an O.R.S. Good luck to both of them! Almost all the stations are aspiring to work NZ and the rest of the world. 1ARY has been handling much European and South American traffic. He has been on consistently, in spite of midyear exams. 1BDX has been doing the same sort of work. The Poultney gang has been stepping out and keeping the second district on the map. There are rumors of a lot of new stations springing up in out of the way places around the state. This probably means just so many more A.R.R.L. stations eventually. Time will tell.

Traffic: 1ARY, 26; 1AC, 11; 1AJG, 27; 1BDX, 28; 1CQM, 14; 1YD, 68.

RHODE ISLAND—1AHE is experimenting with his transmitter trying to get 50 watts output from his 5 watt tube. 1AWE has a new receiver which gets him better DX. 1BCR has moved and is doing fine DX. He gets across in fine shape. 1OW and 1GV are busy making sets for B.C.L's. 1BIE is getting out great with his UV202. 1ABP has been convinced that the short waves are better. He has worked across the pond several times since his QSY. 1AEI is spending his time building receivers. 1AID is working Europe. His fine DC note is reported as very QSA over there. 1AWV is rebuilding his station. He has a passion for rebuilding, the set has been dismantled and put back 5007 times to date. Hi! 1BCC has broken his alliance with 1BCR. He is doing very well, and causing no QRM. He has worked Europe several times. The Providence Radio Ass'n has the call 1LI now and is QRV for traffic. They had a banquet recently at which Mr. Hebert of Headquarters spoke on the History of the League and put over some fine dope to the gang. 1CQO is coming slowly but surely. He has the habit of blowing 5 watters. As a result he is financially crippled but rumor has it that he has his eye on a certain Providence YL. Go to it, OM! 1II-1ZS works Europe regularly. European traffic moves quickly through this station. Blinking lights and B.C.L's prevent the use of highest power until the early A.M.

All the stations in Westerly have worked Europe and this 1AAP has the largest list of Europeans worked and how he does it with 2 five watters is a mystery to some. His new vertical cage is reputed to be part of the secret. 1QV is slamming away with that 50, which he says is about ready to turn over and pass away. Watch 'er, OM. 1BVB is tied up with theatre work most of the time and also has a new coupe that must be taken care of. (Chicken, here's your coop!)

Traffic: 1AWE, 3; 1BCR, 168; 1II, 201; 1OW, 10; 1BIE, 5; 1AKK, 39; 1APB, 32; 1AEI, 2; 1CQO, 1; 1AID, 100; 1LI, 2; 1AWV, 3; 1BCC, 40; 1QV, 37; 1AAP, 8; 1BVB, 30.

CONNECTICUT—Traffic is growing daily. Some station in this state is sure going to get a crack at that traffic prize! Forty meter stuff is getting popular and some of the boys report great daylight DX on this wave. 1CPV works 4BX and several 9's on Sunday morning. He is also QSO across the puddle. 1IV blew the dust off his junk and worked F8CT, just to exercise his tube. 1MK is doing a rushing business noons and always has traffic to move. 1MY has been QRW the past month, but managed to punch a few holes in the ether and keep QSO Europe. During the month 1MY worked D7BN, D7EC, I1MT, F8BA, PCI, and a few British stations. 1AEA is stepping out FB, having worked NOBA, NONL, G5NN and 52WJ. 1BM contents himself listening to the world. Nichols doesn't care about working DX anyway!

1ND works all districts besides G6UF and F8BA. 1AYR is fixing B.C.L. sets so they won't hear him. FB, OM! 1AVW uses one of those 5 watters and has heard 40 miles S.W. of Balboa. Why use the big bottles! 1CKP worked 6TS in broad daylight. Not so bad. Congrats, OM! 1BFI is a new O.R.S. 1AVJ has got his set perking on 75 meters. During the month a transmitter was installed in the State Armory, Hartford, during the winter Exposition. A ten watt set was used and although located under the Band-stand with only 5 feet between the antenna and counterpoise, several 2's and 3's were worked and 133 messages were handled. The operators were from 1BBE, 1BFI, 1AVX, 1AKP and 1MY. The call used was 1MY.

There seems to be a misunderstanding in regard to applicants for O.R.S. certificates. For the benefit of those men, this notice is inserted: Before an applicant receives an O.R.S. certificate, he or she must report traffic handled to the D.S. in his territory or direct to the A.D.M. for three (3) consecutive months prior to the time said O.R.S. is issued.

Traffic: 1AEA, 14; 1BM, 5; 1MK, 131; 1CPV, 41; 1BFI, 6; 1BGC, 10; 1IV, 5; 1MY, 66; 1BGQ, 23; 1AXZ, 11; 1AVW, 15; 1CKP, 7; 1AVJ, 14; 1AH, 1; 1AWY, 27; 1BHG, 35; 1KV, 625.

EASTERN MASSACHUSETTS—Many stations are reporting and showing real life again. The star traffic station this month was 1AF-XJ, who almost made the Brass Pounders' League with a total of 130. A close second was 1GA with 107, and then right on his heels, 1CMP with 103.

1BUO sends in his initial report. 1GA is doing fine DX along with the traffic. He worked NOLL in daylight, besides many stations in England and France.

1BNK, CONCORD, N.H. IS AN AVIATOR

1AF-XJ is working the world, despite the usual midyear exams. 1CJD is operating at 1AR. 1AYX says that he specializes in traffic and that there isn't much of any DX to report. 1NV is hearing all the foreign boys and WJS in Brazil. 1COT continues to QSO the world with his 5 watter. 1BZQ is operating every evening from 7 to 12 E.S.T. He would like reports on his 40 meters signals. 1KY was not able to be on much this month, but she handled some traffic. 1BCN can't seem to hook-up with anyone handling traffic. 1HRR is back on the air with a 50 watter on 78 and 160 meters. He reports fine DX. 1GS is getting out and handling traffic in fine style. 1AIR is another station reporting fine DX. 1CMP is surely doing some world beating DX. During the past two months 1CMP worked 43 English, 16 French, 8 Dutch, 2 Belgian, 2 Danish, 1 Swiss, 2 Italian, 1 Costa Rican, 1 Brazil, 1 Bermuda and 1 Cuban station!!! And he was in frequent communication with New Zealand and Australian stations also. As far as transcontinental DX goes, 1CMP has worked 90 6's and 30 7's. This is surely some station. (Try and beat this!—A.T.M.) 1AYN complains of QRM on the low waves, and he likes 150 better for traffic. 1AVF is another station doing fine DX with Europe. 1DA is aother DX station. The gossip around Attleboro is that 1SE is working all but NZ. 1ADM gets out well on one fiver. 1AHL is still putting 203A's

on the bum. 1BV has two 50's working very FB on 78 meters and is QSO Europe nightly. He turns in a good report this month.

Traffic: 1BUO, 20; 1DA, 3; 1ZW, 10; 1AVF, 49; 1AYN, 24; 1CMP, 103; 1AIR, 14; 1CIT, 10; 1GS, 65; 1AGS, 25; 1AQY, 4; 1LM, 13; 1RR, 30; 1KY, 30; 1BZQ, 67; 1COT, 7; 1AYX, 17; 1CME, 44; 1CJD, 6; 1AF, 130; 1GA, 107; 1AHL, 10; 1ADM, 5; 1NT, 3; 1UW, 6; 1CC, 5; 1SE, 15; 1BDU, 7; 1AXA, 24; 1BV, 84.

Dist. No. 3: 1ARE and 1VC are getting out fine. 1ARE is on short waves and also on 150 meters.

Dist. No. 4: At a get-to-gether meeting, held in the club room of the Springfield Radio Assn. on Feb. 21, 1925, Mr. R. Gross, 1BLU, was elected D.S. of Dist. No. 4. All O.R.S's in this district please forward your reports to him. Mr. Green, of Worcester county, was present. He invited all to attend the convention to be held in Worcester April 3rd and 4th, and he promised the best convention ever. 1ABF has been off during the month, owing to an operation, but he is now home convalescening. 1IL is now on 80 meters, where he is getting out wonderfully well. 1PY is handling his share of traffic. He has a wonderful note and gets out fine. 1BIZ, the only O.R.S. in Northampton, is attending school, but he is heard often and handles a lot of traffic. 1BLU lost a 50 watter and is very careful of the remaining one. He thinks that a fuse in the plate supply is not a bad idea. Hi! 1EO and 1IL have also been on 150 meters, but after March 1st it is doubtful if there will be any stations on 150 meters in this district.

Dist. No. 5: 1BIZ and 1KC are doing good work in this district. The DX to the opposite side of the World seems to be a regular thing with 1KC.

Dist. No. 6: 1CCP, 1BC and 1BOM are the only stations heard in this district.

Dist. No. 7: 1DB has purchased 1AAI's transmitter. He can now transmit through the broadcast period without causing any interference. 1CPN is experimenting on 5 and 20 meters. 1BKQ has handled traffic for Italy, via EAR-6 and has worked G2CC. 1AQM has replaced his last UV203 with a UV203A and has worked across the pond. 1AKZ, using 5 watts, has worked the west coast. He has also been reported in Europe. 1ANR is installing a broadcasting station to operate on 231 meters. The call has not been issued. 1ASU and the R.I. located some illegal spark coil transmitters. Plans for the New England Division A.R.R.L. Convention, to be held at Worcester, Mass., April 3rd and 4th, are well under way. This promises to be the best convention ever held in the New England Division. Bring your wave meters for checking against a calibrated meter at 1YK, at the Worcester Polytechnic Institute.

Traffic: 1ARE, 3; 1VC, 10; 1ABF, 28; 1PY, 20; 1BIZ, 20; 1AWW, 17; 1BLU, 7; 1CPN, 5; 1AKZ, 22; 1AQM, 3; 1BBP, 9; 1ASU, 28; 1DB, 10; 1BIP, 33; 1JE, 53, 1BKQ, 6; 1XZ, 19.

MAINE—Maine has gone DX crazy along with the rest of the eastern stations. Almost every station with a 5 watt bottle has worked England, France and other foreigners. This, I believe, is an unhealthy state of affairs for us. Traffic is not our only excuse for existing, but it is a valuable asset to our life. Let's do more traffic work, gang.

Maine is leading, as it did with the 48 hour delivery law and the Pine Tree News. Now Maine is offering a State Brass Pounders' certificate to the leading station handling traffic each month. The monthly certificate will be printed in blue, and another certificate printed in gold will be offered to the stations that get three blue certificates in six months. We hope that this will increase traffic. As 1IT is too busy to handle the reports, Dist. No. 6 will have a new D.S. as soon as he can be appointed.

Dist. No. 1: 1ALK works England regularly. 1AUR worked Denmark. 1PD is on with 50 watts now.

Dist. No. 2: 1BNL says his tuner is "lousy" with foreigners, but he has worked none yet. He is going to try 20 and 40 meters. 1BUB is the star traffic station. 1APM is down on short waves after a struggle, but he has a hard time to QSR traffic. 1FM is pulling in DX with his 13th tuner. Some of the old timers will be interested to know that "Hunk" Beardsley expects to be going soon. 1BTT has a new tuner and will give the hookup to anyone requesting it. 1APF is building an entirely new set for working between 12 and 90 meters. 1KX has connected with G2RB and G2KF.

Dist. No. 3: 1BDH worked 6GB and was heard in Belgium, France, and Argentine. 1BWX is not as yet an O.R.S., but is doing such good work that he deserves mention. He worked NPCTT, F8GK, G6LF, G6RY. 1CRU is another star at DX, working 8 stations in GB, D7EC and NONL with 70 watts plate input. Vy FB!

Dist. No. 4: 1ACO is changing to 80 meters.

Dist. No. 5: 1AUC says all the stations in his district are working foreign countries, using 5 watt or smaller tubes.

Traffic: 1ALK, 6; 1APF, 42; 1APM, 5; 1AUC, 18; 1AUR, 10; 1BDB, 3; 1BDH, 12; 1BNL, 26; 1BTT, 20; 1CRU, 12; 1CX, 5; 1EF, 35; 1HB, 5; 1KX, 49; 1PD, 6; 1VF, 25.

NEW HAMPSHIRE—1YB has added Italy and Sweden to the list of foreign stations worked. 1ATJ blew his 50 and hitched up a VT2, which went west. Finally he got a 201A working on 80 meters.

Traffic: 1YB, 100; 1BJF, 56; 1AVL, 51; 1BNK, 48; 1ATJ, 32; 1BTF, 10.

NORTHWESTERN DIVISION

Everett Kick, Mgr.

There being so many changes lately, everything seems to be going topsy turvy, but it's no excuse for some O.R.S's to hang back by not sending in reports till things are settled again. Snap out of it, OM's, and send in your reports so we know you're not dead—we're no mind readers.

WASHINGTON — The operating personnel has changed somewhat. 7GE was appointed new A.D.M. 7FN and 7RY were appointed new D.S's of districts No. 2 and 9 respectively. 7AFO was high man for traffic handled. 7MA came next. 7GB is the first station in Washington to work Australia, being QSO A3BD and A2YG, was also heard in Brazil. 7AFN is running on low power, due to transformer trouble. The Radio Club of Tacoma, call 7DK, will be on 40 meters shortly. 7KU has worked Australia and New Zealand and also been heard in the Philippines. 7FD was QRW hashing up B.C.L. sets, but managed to be on occasionally. He was reported in France, Australia and Japan. 7ADQ was heard in England and France on 41 meters. 7DU and 7ADP are consolidating at 7ADP's. 7AJY blew his famous 5'er, but replaced it immediately. The famous Phoard of 7BJ's was stolen—it was found several weeks later at Oregon City, but not the same 4d. Yes, they took the 50 watt radiator cap. Too bad, OM! 7GR was unable to QRO so is on with another fiver. 7AJV works the east quite easily. 7IX has returned after a pleasant trip east, also visited 2BRB. 7JS is back on the air getting out well. 7DF QSO all dists and Z4AG in one night. Blew his 50 though, but at tt he is lucky, as he had a spare one to replace it. 7DC is on, finds the east coast very easy workable on a 5'er. 7PM was QSO Z2AC on 10 watts. 7AF is on again with 10 watts. 7AGI, 7AFO, 7IJ, 7GY and 7ABB work the east coast regularly.

Traffic: 7AFO, 86; 7MA, 52; 7GB, 34; 7KU, 27; 7DF, 23; 7FN, 20; 7DC, 16; 7ABB, 16; 7GE, 11; 7GY, 11; 7RY, 10; 7AF, 9; 7GR, 8; 7AGI, 6; 7FD, 4; 7ZZ, 4; 7AFN, 3; 7AO, 3; 7WS, 2.

OREGON — The DX season is in full swing and there are many new stations on the air. Very few of the fellows are on the high bands. The A.D.M. is re-organizing the state and a lot of new appointments are being made. In Southern Oregon 7MF and 7LS are clearing traffic all ways. 7AV, 7AIP and 7AJB are heard consistently. A few of the 10 watt sets in Portland are 7QD, 7GJ, 7IP, 7QF and 7SB, who are all on the air occasionally. 7IT, the man that used to have the big wallop in Montana, is about ready to have his set perking again, and is located in Portland. 7GQ and 7LR have no trouble in connecting with the "Aussies" or "Zedders," and have handled lots of traffic with them. 7UJ recently connected up with Porto Rico. Some of the boys working in to all districts are 7FM, 7AKK, 7ADM, 7ADA and 7JW. 7PP just buried his last fiver. 7UN and 7SY are both handling considerable traffic with 10 watts. So is 7OK, using 20 watts.

Traffic: 7QD, 44; 7OK, 33; 7AIP, 32; 7LQ, 25; 7MF, 20; 7ADM, 15; 7ALK, 15; 7PP, 10; 7AV, 9; 7VP, 9; 7FM, 6; 7AKO, 6; 7FR, 6; 7ND, 4; 7LW, 4; 7GV, 2; 7ADA, 2; 7LJ, 1.

MONTANA — Cutting, 7ZL, resigned A.D.M. on account of being too QRW, thereon recommending Amdahl, 7WP, his successor. 7WP accepted and will do his best to restore Montana, so it will be a "top-notch" state. Hop to it, OM's, and lend him your assistance. 7EL, using spark coil C.W., is on most every night, but reports traffic buried. 7DD contem-

plates putting in a 250 within a few weeks. 7MX and 7GS are new O.R.S's and get out well. 7GK is remodeling for the 40 meter wave. 7NT has started an interesting code and lecture class, therefore helping out many converted B.C.L'S to the right tracks. 7ACI is bothered by too much school QRM, is only on occasionally on 40 meters. 7HY just received his license, will be ready for traffic soon. 7WP is overloading his 5'ers too much and the only direction he gets out is his tubes going west. 7MP is on quite regularly. 7MB worked a 3 on a 201. 7HM will be QRV for biz shortly. 7AGF isn't on very much.

Traffic: 7DD, 13; 7EL, 9; 7MX, 6; 7NT, 3; 7GS, 2.

IDAHO — No report from the A.D.M. this month for some reason. 7ZN is heard once in a while on 80 meters. 7SI, Idaho's Y.L. station, is QSO many stations. 7UH handled a number of messages, also has a schedule with 7SI, and it's doubted if much traffic is handled. Hi! A new O.R.S. is 7OL. 7KI was on 180 meters until lately, when his fire bottles decided to desert him. That's too bad, OM.

Traffic: 7UH, 20; 7KI, 12; 7OL, 10.

IDAHO — Dist. No. 4: There are more stations on the air now in Idaho than ever before. O.R.S. certificates have been issued to 7SI, 7OL, 7IU and 7AHS. 7AHS has the largest total of the state. 7QC is at Klockman now. 7KI was on 180 meters until his fire bottles deserted him. 7GW reports that things are promising. 7PJ and 7FT have left to pound brass on the briny sea. 7SI is moving to Sunny California. 7RQ is working out well on a fiver. 7VU will be on as long as his bootleg tubes hold out. 7YA is going after a silence of two years. Remember him in the old days when he had a 2 kw spark. The operators are 7OB, 7RQ, 7VU, 7LO and O'Reilly who will have his ticket soon. 7UH handled a number of messages and has a schedule with 7SI. 7OL does well with his 10 watts.

Traffic: 7AHS, 36; 7UH, 20; 7KI, 12; 7OL, 10.

PACIFIC DIVISION

M. E. McCreery, Mgr.

SOUTHERN CALIFORNIA—Communication with Australia and New Zealand has been one hundred percent all through the month. Considerable interest is being displayed here concerning the Traffic Department Trophy that is to be awarded. If the fellows settle down, the trophy has a good chance to rest in our division. Practically every fellow in Los Angeles has complained of power leak noise. However, the bunch have received all of their DX through this noise. A large attendance is expected at the banquet and ham-fest to be held March 6th by this division. More fellows are moving down on the 75-80 meter band, and 200 meters is almost QRM-less.

Dist. No. 1: 6CGO is going strong again after being off for a month on account of trouble with his 250 watter. He has worked eleven New Zealand and Australian stations to date, and is the best station to QSR traffic to those countries. 6AIB is QRW school, but on regularly on Friday and Saturday nights. 6LA is using a 5 watter and consistently working all districts. 6CNK is moving into a new shack, located under a new antenna and counterpoise. 6BIK has a new M.O. set going now. 6CGV is operating a five watter but expects to have a 50 watter before long. He is ready for all kinds of traffic. 6AVR is quitting the game (women), and asks that his O.R.S. be cancelled. 6ZH is the first station in San Diego to work New Zealand after trying for a long time. He just received a letter from South Africa reporting his sigs there. 6CGC is using 100 watts now and stepping out fine. He has been reported in England. 6CHX now uses a 50 watter and gets out much better than before. 6BAS is getting out fine, though not on much. 6CDV has sold his radio junk and bought a car to chase the YL's with. Another good ham gone wrong. There are many new stations in San Diego now, and we hope to have some more O.R.S's there soon.

Dist. No. 2: Things are as good as expected in this territory. Plenty of pep exists and things look bright. A large attendance is expected to turn up at the ARRL banquet and ham-fest on March 6th. 6AFG has decided that a single wire antenna gives the best push to his sigs. 6BJX has a real master oscillator working fine, but he lost out on his regular QSO with New Zealand. His dependable work as an O.R.S. deserves special mention. 6BQR is going to use higher power providing the super-het that he built is sold. 6AAO has unfriendly relations with a new 15,000 volt power line. The noise it makes is concentrated on 80 meters, which makes it most unpleasant. 6OF is a new O.R.S. who has done good DX traffic work. He has a nifty card for relaying radiograms by mail. 6RF has a fiver perking. The college QRM puts a wet blanket on his DX enthusiasm. He still has time QTC however. 6CBB's 250 reaches out on 80 meters. 6BEC is waiting for needed transmitting apparatus. 6IH worked plenty of DX when 6CBB is not on. His dog sleeps in the same room with the rectifier, which accounts for the pure QSB. 6CSW is always there with the goods. 6CTO mourns the loss of his 50. 6PL has blown two of his 50 watters and is off for at least a week. 6AJI is the new C.M. of Riverside. His work starts off with a bang the first month. 6US has his set mounted on a keen glass panel, the only one we know of. 6GT has been heard in England on his 5 watter. The D.S. would like to bring to the front the work of 6BUR, the C.M. of Whittier. Though it is a small town, his work is better than most of the men in the city. Always a pioneer in anything that will benefit the A.R.R.L., 6 AHP has worked WJS besides the regular run of New Zealanders. 6CSS has been heard in several places. 6BUW finds a little time to be on the air. 6CMQ went down to 40 meters but the lack of QRM made him lonesome. 6BLS is thinking of coming back on the air. 6RN is only on twice a week, due to QRM from school, which is a bit bothersome. 6BBQ swiped his mother's custard cups for insulation in the shack. (That's nothing, we know that 6MG takes his father's razor.) 6BIB's OM propped up the counterpoise with a piece of pipe. No, gentle reader—not a briar pipe. 6CGW works everything on his new 1000 watter. 6CAE has moved to a new QRA. 6AGK is now on 40 meters and keeping 6TS company. 6TS works 1XAM every noon on 40 meters. 6BCS is a new O.R.S. and starts things off in fine style. 6AKW keeps up his splendid records of the previous months. 6ALF had hopes of growing a mustache, but he gave up in despair after letting it grow for two months.

Dist. No. 3: Now that the Brass Pounders League is started again, things are different. 6AKZ has been on regularly and working NERK in the hanger at Lakehurst. 6CMD is coming on with a new 50 watter. 6CGD has his motor generator fixed and will be on as soon as he gets his licenses back.

Traffic: 6BAS, 27; 6CGO, 76; 6ZH, 65; 6AIB, 54; 6CGC, 21; 6CHX, 15; 6CNK, 15; 6LA, 12; 6BIK, 10; 6OP, 5; 6CDV, 1; 6CBB, 13; 6RF, 23; 6OF, 7; 6AAO, 32; 6BQR, 18; 6AFG, 54; 6BJX, 50; 6RN, 35; 6CSW, 27; 6CTO, 16; 6AJI, 20; 6US, 6; 6BCS, 17; 6AKW, 38; 6CMQ, 12; 6BBQ, 48; 6AGK, 6; 6CGW, 37; 6CAE, 9; 6PL, 54; 6ASV, 11; 6CMD, 2; 6CDG, 4.

CENTRAL CALIFORNIA—6MP is doing excellent work. 6CLP worked NZ and Australia and handled a lot of traffic. 6FY is one of 10 hams to be heard in Philippines. 6CJJ is pounding out fine. 6CCY is QSO N. Z. and Australia with 5 watts. A large traffic total is also FB. 6ADB is rebuilding the set into an all wave transmitter. 6AFQ reports stepping out as per usual. 6AME blew his 50 watter and is now using a 5 watter and working all districts. He has a special receiver which drags Australia in with the aerial in a sending position. FB. 6ADB deserves credit for the activity in this district. 6ALW was heard in Glasgow, Scotland, with 40 watts input. FB. 6BCL worked N. Z. and Australia often. Also HVA in French Indo China was worked. HVA's QRH is about 89 meters. 6CFI put up a new antenna and he expects to rattle the cans in N. Z. 6CIE is attending a radio school in San Francisco. 6CEI handled his usual amount of traffic. 6ZAU moved to Pacific Grove, and expects to put up a 100 watt station using pure DC. 6BDT is on very little on account of school. 6UW is using a new pancake made

6CMI IS A DEPUTY SHERIFF

of nickel stripe and glass. He was rewarded with 25% increase output. 6OI hopes that message traffic will increase. 6AMM says messages are scarce. He was heard in the Philippines using two five watters. FB! 6BMW lost his mast but it is up again. 6AJZ has just started up on 80 meters. He expects to create some disturbance. 6HC is building his own power tubes and rectifiers. FB! 6BON is putting in a new radiating system. 6CKV put in a new aerial and "SW" tube rectifiers. 6NX is about the only station on any great amount of time. There are several new operators in the making, and soon they will make the old timers sit up and take notice.

Traffic: Dist. No. 4: 6MP, 5; 6CLP, 31; 6FY, 7; 6CJJ, 4; 6CCY, 31; 6ADB, 7; 6ACU, 3; 6AME, 21; 6ALW, 11; 6BCL, 16; 6CEI, 3; 6BDT, 2; 6UW, 3; 6OI, 31; 6AMM, 5; 6BMW, 1; 6BON, 1; 6NX, 7.

Dist. No. 5: 6BUF reports 80 meters FB and will QSY to 40 meters soon. 6BAA and 6AWQ are rebuilding for short wave work. 6BQL has discovered that he has been using the second harmonic transmission from his Meissner circuit. He has changed to a coupled Hartley and doesn't know as yet how it gets out. 6CSN says his 80 meter set isn't working as it should. 6AMS reports that he will be on 80 and 160 meters using five and fifty watt tubes. 6CW put up a vertical antenna and tuned the set to 40 meters. He says he is going to stay there. 6EE-6APH reports that he has just got a receiving tube to perk on 80 meters. 6AUN has blown his fivers. He will be on short waves soon. 6CLV put up a new stick and reports that the birds gave him the HI HI while it was going up. He has a fiver perking on short waves. 6DG reports that everything was peaches and cream until his tubes departed. 6BNT is experimenting with an arc on 80 meters. He reports that he is going to get it to work or bust. That's the spirit, OM! 6CLS reports moving and rebuilding. 6HJ says that he will change his location soon and get away from the numerous BCL's that now surround him. 6AC reports doing good work with the Australasians. He reports working Z1OA, Z2AC and A2BK. 6CHE is going to change his QRA. 6CPW is another of our sad mourners. His fiver also went west. 6BFY reports very little doing until next pay day. Hi, OM. 6CSL has rebuilt and expects to work some eastern stations before summer. 6RW says nothing extraordinary has happened yet. 6ZAZ is QRW with BCL sets. 6AWW reports not much doing. 6AXZ is still going. 6CHL has been QSO Z2AC, Z4AG, A2YI, A2YG and JA2 at Nagasaki, Japan. A ship op has heard him off China. If things keep going as now we are afraid a feminine style of sending will be noticed on his sigs. 6AWT has been QSO a few new Australians, and also WJS in Brazil, JA2 and HVA. He has now been heard in all parts of the world, civilized and otherwise.

Traffic: Dist. No. 5: 6AWW, 28; 6BUF, 6; 6BAA, 5; 6CSL, 5; 6BFY, 2; 6CPW, 10; 6CHE, 7; 6AC, 28; 6HJ, 10; 6CLS, 1; 6DG, 2; 6CLV, 9; 6AUN, 22; 6APH, 1; 6CW, 37; 6CSN, 15; 6BQL, 19; 6ACR, 11; 6RW, 2; 6CHL, 18; 6AWT, 20.

Dist. No. 6: 6AJF is on 40 meters. He works the east coast in daylight. 6ARB has the usual long list of DX reports. He worked every state and 11 countries. 6CDP is on part of the month only. Using nine 5 watters he worked several hundred miles. 6CEG is having a hard time getting his 80 meter set to work. 6CLZ is spending all his time receiving. He hears 'em all. 6CUT is not on the air. He now has a commercial ticket. 6GU is now on 80 meters and works out well. 6QV is attending U.C. 6BFU has a new antenna and has been heard by several east coast stations. 6WP has a fine report this month. Keep it up! 6CEJ calls attention to the fact that his address in *QST* is wrong. Correct one is 6CEJ-3718 Porter St., Oakland. 6BMV blew both tubes. 6BIP-6TI makes a 50 watt tube run cool with 250 mils plate current. How come? 6EW is doing fine work with an underloaded 50 watter. He has been heard in India, England, France and China, using a single wire antenna. No so bad! 6ANW is doing good work with 5 watts. 6CTX is preparing to get down on the short waves. Good luck, OM. 6HP has a new antenna of one wire. He hopes to get in a few DX records himself.

Traffic: Dist. No. 6: 6AJF, 4; 6ARB, 14; 6CDP, 13; 6CEG, 5; 6GU, 23; 6BFU, 44; 6WP, 109; 6CEJ, 27; 6BMV, 8; 6BIP, 15.

NORTHERN CALIFORNIA—Dist. No. 7: The outstanding feature this month was the work of 6CC, an old timer. In his first report he writes that he was QSO Australia several times, and his traffic handling was worth while. Let's shoot at the mark he has set, fellows.

During the storm and flood in the Sacramento Valley, the A.D.M. wired 6CC at Colusa and 6BUA at the Willows to keep communication open for the Western Union and Southern Pacific Railroad. 6BUA reported QRV and 6CC reported arrangements all made to take over traffic at the first break in wire service. FB, Men! Glad to see reliable stations. 6GR is on again. 6FG has changed to a vertical pipe antenna with a copper ball on top. 6DD is on 80 meters now. 6AGE has been making some changes. He will have two sets. 6ABX also has both sets going now.

Traffic: 6DD, 2; 6FH, 3; 6GR, 4; 6AGE, 2.

Dist. No. 8: 6BUA is on the 150-200 meter band. 6CC is on short waves. He is the star station this month.

Traffic: Dist. No. 8: 6CC, 168.

NEVADA—6UO is our most active O.R.S. this month. He blew his 50 watter, but does great work on 10 watts now. He loose-coupled his set and is experimenting on 75 meters for better relaying. More power to you, OM! 6AJP is doing very creditable work. He is in line for an O.R.S. Keep up the fine work, OM! 6ATN remains on the coast signing 6CKF. He wants to arrange schedules with other stations.

Traffic: 6UO, 12.

ARIZONA—Nearly all our stations are on short waves, improving their stations to make eighty meters a permanent, traffic handling, wavelength. Several fellows have tried the 20 meter stuff, but do not like the band as well for regular working. Lots of experimental work has been done on 5 meters at 6ZZ the last two months. 6PZ raises new stations every night. No one has much QTC, and he is hoping this condition will improve around Yuma. 6CUW is going strong. 6CSO has regular schedules east and west. He handles the bulk of Ariz. traffic on 80 meters. 6ANO comes next in the number of mags handled. 6AAM and 6BBH are doing good work. We hear Phoenix stations working early in the morning. The Sixth Dist. Radio Supervisor and the Radio Inspector were on an inspection trip thru Arizona. They are trying to clear up interference from the smelter rectifier plants with some measure of success. 6ZZ, who installed some of these plants, lives only 500 feet away.

Mr. Lovejoy held amateur and Commercial exams in Douglas, visited all the fans, spent a short time in Bisbee, and then left for Nogales and Tucson. During his last visit in October of 1924, 6ZZ was with him for several days, visiting most of the best amateurs in the state.

Traffic: 6CSO, 218; 6ANO, 85; 6AAM, 15; 6CUW, 28; 6GV, 28; 6ACN, 9; 6PZ, 6; 6ZZ, 11; 6GS, 2.

HAWAIIAN ISLANDS—Someone asks why aren't the amateurs of Hawaii making themselves heard on the mainland. Honolulu newspapers are publishing a weekly radio page and would like dope regarding the amateurs. The papers certainly are having a fine time getting news, and most of the news they run is BCL stuff.

Reports say no locals are QSO the coast. Come on Hawaii, let's change that report next month!

Cantin is going down to 80 meters. He is waiting for a short wave meter from the coast. Cantin says, "How can I make myself heard when I can pick up all districts on 80 meters? What sixth district station will answer my sixth district call when they are all trying for DX? Hearing me sign off a six call won't make 'em realize that I am over 2100 miles away." Listen for him, gang.

The first American Radio Relay League Meeting of the year for this section was held under the supervision of the D.M.

The meeting was called to order by the president of the Western Amateur Radio Assn., and after a short resume of club business turned the meeting over to P. W. Dann, who was the A.R.R.L. spokesman of the evening. Mr. Dann read the 6th division *QST* report, and then asked each of the district superintendents and city managers to tell of the conditions in their territory. 6AWT reported everything fine in his section. 6CHL has little trouble in getting reports in on time. 6ALW reports everything running smoothly, although his city is rather dead at present. 6HP has finally registered in the minds of the gang that the reports must be in his hands by the 18th, and that a few days late will not do. 6CDP reports everyone cooperating within his territory. 6BIP told his fellows, straight from the shoulder, what he thought of their doing. Steps are under way to eliminate all but active material in this section. 6BIP's telephone no. is Lakeside 2486. He says please phone late reports.

6AWT has been appointed Official A.R.R.L. Broadcasting Station for this portion of the state. He will use 80 meters for this work.

Mr. Linden, Radio Supervisor, was present at the meeting and furnished several illustrations of the right method of clearing up BCL interference complaints. When a Broadcast Listener reports amateur interference to the Radio Supervisor, his complaint is given immediate attention, and is usually cleared up at great expense. Most complaints are temporary misunderstandings with the amateurs, which could be cleared up without the intervention of the government. The amateur is customarily willing to sacrifice many things in behalf of the BCL, and they will find that a talk with the amateurs in their neighborhood will not only clear the air for them but will cement a friendship which will be useful to them in obtaining the greatest efficiency from their receivers.

Mr. McGowan, Radio Inspector, was enticed into giving those present the latest dope on the Washington Radio Conference. The most important amateur changes, as printed on page 29, of March *QST*, were reviewed.

The A.R.R.L. is opening a membership campaign, and it is hoped to double the membership in this district within the next few months. An active interest in amateur radio is the only requirement necessary, if one wishes to join the A.R.R.L.

The next A.R.R.L. meeting of the 4th, 5th, and 6th districts will be held under the direction of the S. F. Radio Club and in San Francisco. KFUU is the call issued the new broadcasting station owned by 6UR of San Leandro. The station will come to life on or about the 11th of February. According to the latest reports, 6AMO, 6CCT, and 6 ARB have been heard in China. This is the first time in history that amateur signals have been picked up in that country. British station 2KW is working on 100 meters and is anxious to work Pacific Coast amateurs. He is on the air every evening between 10 and 12, Pacific Time. 6TI has added another country to his lengthy list. Recently 6TI has been heard in France. 6ARB has succeeded in working an English amateur. 6AMO and 6WP also worked English 2MN a few nights later. 6AMO has blown his last 50 watt bottle and retired from active operation. 6WP has a habit of making new DX records. His latest is working a ship on amateur waves while the ship was off the coast of Chile.

6CZL has rebuilt his receiver and reduced the losses. 6AUY has worked several Australian and New Zealand amateurs. His transmitter is homemade, using two fivers, which push through to Australia with but little overloading. 6AQ is having a great deal of difficulty in making his transmitter work on 75 meters. 6BW and 6AJF are conducting short wave tests with the U. C. They have been able to make an oscillator work on 1½ meters. 6CEJ is taking lessons on the saxaphone, and owns a car. 'Nuff sed! 6SR has lost a splendid Father following a short illness, and finds it necessary to quit the amateur game for some time. Sorry, OM. 6CMG is back again with 50 watts. At present time he is using A.C. on the plate, but he expects to have a pure note as soon as he can complete his rectifier. 6CRM has dismantled his set temporarily. 6MR is back on 5 meters again.

ROANOKE DIVISION

W. T. Gravely, Mgr.

VIRGINIA—Following are new D.S's with counties assigned to them. Stations interested should communicate with these D.S's: Dist. No. 1: E. I. Smith, 1115 Manchester Ave., Norfolk, Va. Counties of Nansemond, Norfolk, Princess Anne, Isle of Wight, Charles City, New Kent, Hanover, Caroline, Westmoreland, Richmond, Essex, King and Queen, King William, Northumberland, Lancaster, Middlesex, Mathews, Gloucester, James City, York, Warwick, Elizabeth City, Northampton, Accomac, King George, Dist. No. 2 R. J. Carr, 715 Union Ave., Petersburg, Va. Counties of Pittsylvania, Campbell, Appomattox, Buckingham, Cumberland, Prince Edward, Charlotte, Halifax, Mecklenberg, Lunenburg, Nottoway, Amelia, Powhatan, Chesterfield, Henrico, Dinwiddie, Brunswick, Greenesville, Southampton, Sussex, Surry, Prince George, Goochland, Fluvanna, Louisa. Dist. No. 3: J. P. Hyde, Bristow, Va. Counties of Bath, Rockbridge, Amherst, Nelson, Augusta, Highland, Rockingham, Greene, Albemarle, Orange, Madison, Page, Shenandoah, Rappahannock, Culpeper, Stafford, Prince William, Fairfax, Fauquier, Arlington, Warren, Loudon, Clarke, Frederick, Spottsylvania. Dist. No. 4: E. D. Gray, Blacksburg, Va. Counties of Alleghany, Botetourt, Beford, Craig, Roanoke, Franklin, Henry, Patrick Carroll, Floyd, Montgomery, Giles, Pulaski, Grayson, Wythe, Bland, Smyth, Washington, Tazewell, Russell, Buchanan, Dickenson, Scott, Wise, and Lee.

WEST VIRGINIA — 8ASE is still on 150 meters. 8DFM attended the Pittsburgh convention. 8BSU-8AKZ is overhauling and installing 100 watts. 8BSK is testing on 80 meters and doing fine work. C. S. Hoffman, Jr., C.M., Wheeling, has recovered from serious illness. A.R.R.L. BC's in Wheeling are being handled by 8BSU on 80 meters and 8ASE on 150 meters. Huntington has a new ham in Mr. Young, an ex-Navy op, call 8DJN. 8CQH is putting in a new 250 watter. 8AMD is on 40 meters. Reports FB, says less QRM. Is on short waves for good.

NORTH CAROLINA — This report was transmitted direct to 3CA by wireless from 4JR in daytime. Since the appointment of 4TW as D.S. everything is running smoothly. 4OG is handling traffic on 160 meters. 4TW is working DX with 80 meters. 4TW has the honor of being the only North Carolina station to work RCB8. He is also QSO Europe. 4LO has been issued an O.R.S. certificate and is heard in Europe and New Zealand. 4RF has applied for an O.R.S., but is quiet just now. (Smatter, OM, tube gone west?—D.S.) 4NV is still QRW with his bride to be. 4LJ expects to get back on with a 201A on 80 meters.

Traffic: 4OG, 80; 4TW, 15.

Dist. No. 2: 4MI turns in his report over the air via 4GW as the antenna came down at 4MI. 4NJ will be back soon. 4GW is raising the usual noise and working everybody FB. 4MI has worked "SJ" in Costa Rico. 4TS failed to report. (Smater, OM?) Read the statements you signed on that O.R.S. certificate—A.D.M.

Traffic: 4MI, 45; 4PE, 12; 4GW, 6.

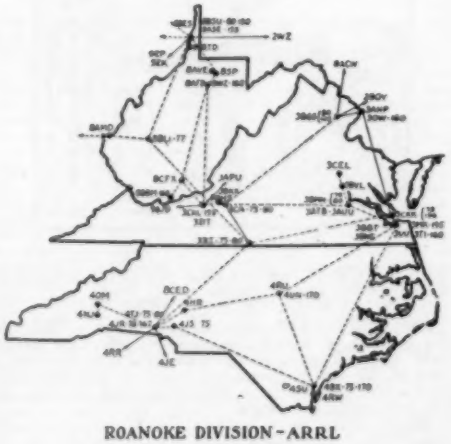
Dist. No. 3: 4HR is still on 150. He says he does not get his QSTs. (Maybe the postman swipes 'em, OM. Hi!—A.D.M.) 4TJ is fooling with a superhet. 4TJ has the honor to be the first "4" to work Brazil, having worked the Hamilton Rice Expedition, WJS. 4JR also worked Brazil. 4JR has been doing well on 40 meters, having worked 6TS and 6AGK with an input of 60 watts.

Traffic: 4JR, 103; 4HR, 20; 4TJ, 16.

Dist. No. 4: 4RW is back with a 5 watter on 182 meters and moving traffic. 4RU has his BC station going ok now and is building an 80 meter ham set. 4UN is doing good work on 160 meters. 4NT failed to get his report in. 4RX is doing excellent work on 80 meters nightly. He is on every day from 6 to 7.30 P.M. and 10.30 P.M. to 11.30 P.M.

Traffic: 4BX, 20; 4RW, 13; 4UN, 12.

VIRGINIA — 3BNE has a 100 foot tower now. 3BNE will work on 75 and 150 meters at the beginning. 3OL has a 50 watter going now on short waves. 3MK is getting out fine on one wire. 3GKA hears lots of foreign stuff. 3CKK would appreciate reports. 3CJU has been sick. 3TI is operating on low waves under call 3KS. 3QC is reported in England. 3AFX is QRV traffic on 80 meters. 3SB is



ROANOKE DIVISION—ARRL

Norfolk's newest station. He breaks through with one UV202.

Traffic: 3MK, 18; 3TI, 18; 3OL, 3; 3CJU, 2; 3EH, 1.

This report was transmitted by wireless, 3BMN to 3CA. 3ATB has a new mast. 3AOT and 3AUU are putting up new masts and making short wave transmitters. 3ABS is on 80 meters. 3BMN handled 20 messages this month in four days. He worked WJS in Brazil and 6CGC. 3UY is active on 80 meters.

Dist. No. 3: 3BGS reaches out well with one UV202. 3YK-3BQ VMI are on 155 meters. They will have several short wave sets on the air soon.

Dist. No. 4: 3CKL handled 4 messages. 3BZ relays traffic from WJS to Danville via 4TJ. On Feb. 18th WJS got a reply in 15 minutes. On Feb. 20th 4TJ-3BZ pulled another one. 3BZ gave 4TJ a 51 work message for McCaleb on WJS, 4TJ gave it to WJS OK. WJS gave 4TJ a 58 word message for Danville, which was copied direct at 3BZ and delivered. Not a bad evening at that!

ROCKY MOUNTAIN DIVISION

N. R. Hood, Mgr.

COLORADO—Dist. No. 1: 9DED has a new antenna and is back on the air putting through messages. 9QL is changing to 80 meters. 9BVO is getting out fine on 82 meters. What's the matter with the old gang in Denver?

Dist. No. 2: Five stations, 9CDE, 9CHT, 9CLD, 9DFH and 9EAE have all been on regularly with message traffic. 9CHT has been sick and has also had sickness in the family. He is now back on the air keeping in touch with his wife, who is in Mayo Hospital, through amateur station 9COS. He received nightly reports on his wife's condition when it was serious.

Traffic: 9CDE, 7; 9CHT, 7; 9CCLD, 18; 9DFH, 30; 9EAE, 121; 9BVO, 7; 9DED, 15; 9CJY, 6.

UTAH-6BLH has earned a position in the starred square this month. He is using a new style of transmission with the inductance out in the yard under the antenna. 6BUH is experimenting with an arc on 150 meters. 6RM, 6ZT, 6CBU and 6FM forwarded reports. Dist. No. 1: 6CBJ is active, working prac-

tically all night. We are glad to see the amount of experimenting that is going on in Utah.

Traffic: 6CJB, 22; 6BUH, 2; 6BLH, 153.

WYOMING—7AJT reported for duty. 7HX, old Doc Van Slyck, put through some traffic this month. 7HW is moving to Denver next month to take a position in the Engineering Dept. of the Mountain States Tel. & Tel. Co. Put 7HE back on the air, OM when you get there.

Traffic: 7HX, 18.

SOUTHEASTERN DIVISION

H. L. Reid, Mgr.

FLORIDA — Every 5 watter in the state seems to work the Pacific coast with ease, and several get into Europe and N. Z. Traffic has taken a decided jump, with every O.R.S. in the state on short waves. Florida has 27 active traffic handling stations.

4FS, with an input of 40 watts, worked N.Z., Holland, France and several Britishers. 4DU worked Holland and England regularly on his 50. He blew his 50 and now works them with a fiver. 4KK works all the U.S. with a fiver. 4PK has reports from all over the world. 4EZ works Georgia and Florida in daylight with a 201. 4SB worked England, France and Belgium with an actual input of 16 watts. 4PI has a German 30 watter and he does better DX. 4UA is the most conscientious O.R.S. in the state, and champion message pusher. 4BL and 4IZ have the next best totals. 4XE works the Pacific coast at noon on 20 meters, calibrates wave meters for Florida hams, is a valuable O.W.L.S., and in addition, is one of the best men handling traffic. 4QC is another old timer. He is a new O.R.S. and a valuable one. The A.D.M. says fellows in district No. 4 are genuine high-tension hams. 4FM has worked N.Z. and Holland with 40 watts on a UV202. 4CH is copied all over Europe on a 5 watter. 4QY is QRW but handled lots of traffic. 4NE and 4IG have good contact with Cuba.

Traffic: 4FM, 88; 4UA, 51; 4BL, 47; 4QY, 32; 4IZ, 31; 4XE, 26; 4PK, 25; 4CH, 15; 4EZ, 11; 4QC, 10; 4FS, 8; 4KK, 9; 4IG, 7; 4PI, 5; 4PB, 5; 4NE, 1.

ALABAMA — Dist. No. 1: 5ZAS reports working across the Pond in daylight at the cost of two 50 watt bottles. 5WS is back and can be heard regularly. 5ADS still pounds 'em out with 10 watts on 80 meters. 5VV threatens to desert the low waves. 5AEF has been heard in England twice in the last month. 5ARI works regularly with 50 watts on 80 meters. 5EQ of Tuscumbia has been made C.M. and makes his first report as O.R.S. this month. 5KQ is knocking 'em dead on 80 meters. 5ABS, 5QE and 5LN are good O.R.S. prospects.

Dist. No. 2: 5QK leads his district with traffic handled, using two UV202 tubes. 5QF worked 7FN in Everett, Washington. 5AC reports good DX and has logged many foreign stations. 5AC is QSO the west coast every morning. 5QF is doing good work with a 5 watter on 170 meters. 5AR is on the air regularly handling traffic. 5AON is on with two UV201A's and he says "he is little but loud." 5AAD is a new appointed O.R.S.

Dist. No. 3: This district has been reorganized and now has a live organization with plenty of promising material. 5WI leads in traffic handling. 5AJP and 5ADA have also done good work. 5AJP is regularly on 155 meters with a pure D.C. note. 5ASU boasts a new shack and two transmitters. 5ATP is on 80 meters raring for traffic. 5WI is best for steady operation and consistent traffic handling. 5WI works on 184 meters. 5DI sent a 5 watter west. 5NI, can be heard across the Pond. 5AUJ and 5AUK are on the air and promise to do good work.

Dist. No. 4: 5XA continues to pound the brass.

Traffic: 5AC, 106; 5ADA, 34; 5ADS, 24; 5AEF, 10; 5AJP, 37; 5NL, 5; 5AOM, 3; 5QF, 86; 5QK, 182; 5AR, 48; 5ARI, 3; 5ASU, 11; 5ATP, 6; 5VV, 5; 5WI, 40; 5WS, 13; 5XA, 133; 5ZAS, 8.

GEORGIA—Dist. No. 7: 4EQ has connected with WJS and Europe. 4OA lost his tower in a wind storm. 4IO blew a 203A but worked Europe. 4SI worked F8GO with his 5 watter. 4KU did about as well as usual. 4FZ worked Belgium and Italy.

Traffic: 4EO, 10; 4EH, 5; 4IO, 19; 4OA, 5; 4SI, 15.

SOUTH CAROLINA — But two stations were in operation. 4IT was on regularly and handled traffic. Too much voltage came to see 4RR and took away his five watter. 4HW has done some good work, also.

Traffic: 4IT, 13; 4RR, 3.

PORTO RICO — With the excellent radio weather we are having, the gang is keeping the Island in constant touch with the Mainland and with Europe. 4SA is working English, French, Danish and Dutch amateurs on 75 meters. 4JE has moved and is doing excellent work. 4KT, 4RX and 4UR keep inland traffic moving. 4OI is back on the air. 4BJ is most dependable for San Jose bound traffic.

Traffic: 4SA, 28; 4KT, 16; 4JE, 23; 4BJ, 7; 4OI, 2.

WEST GULF DIVISION

F. M. Corlett, Mgr.

The division is again well organized, except for New Mexico, and probably by next report that state will be in line. The star brass pounder of the division is 5QY.

Little traffic, lots of over-seas work and TOO MANY COMPLAINTS from B.C.L's continue. Those

who believe in amateur radio and in its future, are advised to subscribe to the Government "Radio Service Bulletin" and obey the law. If you can't operate without having neighbors visit your shack with shot guns, it is time to lay off the key and to try some experimenting.

To make friends with the public operate your station properly deliver or relay messages promptly, learn radio, and be ready to assist the novice at all times. Cultivate a sunny disposition!

OKLAHOMA—All Oklahoma stations PLEASE mail your reports to the A.D.M. on the night of the 20th if you want to see them in QST. 5ANL has applied for O.R.S. 5UJ lost an "S" tube but is back and reports working ABC on 40 meters in daylight. 5ADE's 50 watt bottle is still in the harness. 5AGN has no luck on 75 meters but is FB on 150. The A.D.M. heard the C.W. of 5APZ calling a few days ago. Better QSO, fellows. 5ADO is working for an O.R.S.

Dist. No. 2: 5AGK is reliable in reporting.

Dist. No. 3: 5TW runs off with honors for Oklahoma this month. 5JU handled a few and is the new D.S. for Dist. No. 3.

Dist. No. 4: 5AHD sent in a good report. He worked N.Z. and Australia this month. 5ZAV-5AIU has a schedule with 6AFG for traffic handling.

Traffic: 5APG, 2; 5UJ, 2; 5APZ, 5; 5ANL, 21; 5ADO, 15; 5APQ, 23; 5ADE, 66; 5AGK, 16; 5TW, 96; 5JU, 11; 5ZAV,-5AIU, 20; 5AHD, 20.

NORTHERN TEXAS—Reorganization has hit this section of the country and now we have some well organized personnel. No unusual DX work was reported. Stations working foreign countries were: 5DW, 5QY, 5SD, 5CV, 5AFU and 5AKQ. 60 report cards were sent out and 53 came back on time. FB! 13 Stations are working between 150 and 200 meters; 33 on 75-85 meters and 4 on waves below 75 meters.

Traffic: 5CV, 4; 5SD, 21; 5ATX, 6; 5AKZ, 20; 5AFU, 59; 5AKQ, 28; 5AGQ, 50; 5OT, 20; 5ASZ, 28; 5AJJ, 86; 5VF, 16; 5ACL, 8; 5CT, 8; 5HY, 10; 5AKN, 4; 5AKF, 14; 5OQ, 5; 5AIJ, 1; 5AJH, 16; 5UO, 15; 5AJT, 8; 5JF, 16; 5FC, 97; 5QY, 178; 5ADH, 12; 5ALJ, 12; 5VU, 37; 5CC, 11; 5AMS, 16; 5NW, 21; 5LI, 12; 5DW, 5; 5JH, 12; 5ADD, 16; 5AQL, 4; 5AKX, 14; 5AMB, 10.

SOUTHERN TEXAS—Dist. No. 6: The D.S. has been sick but gets on occasionally. 5ZF has had his hands full convincing B.C.L's that the code interference they got was from ships in the Gulf. 5OX says that everyone is trying for foreign DX. Houston amateurs are trying to minimize key-clicks.

Dist. No. 7: 5ZU has a live district and is going strong with a four coil Meissner. He is getting ready to work on 80 meters. 5FT handled some traffic. 5ALR was on only 15 hours. He handled one from Z2AC and received reports from England, New Zealand and Australia. 5APM did good work on 80 meters, until his tubes went west. 5JT is out due to transmitter trouble. 5GW has the "Flu" and he is spending his time in painful recovery.

Dist. No. 8: 5ZAE represented Director Corlett in the recent Director's meeting at Hartford. He had a pleasant and profitable time. 5AEP has gone to college at Wichita Falls, but will be back on in June. Good! 5ADI is being remodeled. 5ABJ did splendid work in relieving telegraph companies during the sleet storm. 5MS is putting in 50 watts. 5EW is working with a 50 watter and is QSO England. 5ACZ did a large amount of relaying this month. He is making up for lost time and is QSO all districts.

Traffic: 5ZF, 17; 5ZU, 5; 5ALR, 1; 5FT, 13; 5APM, 3; 5ABJ, 21; 5MS, 15; 5ACZ, 140; 5EW, 24; 5ZAI, 32; 5OX, 32.

NEW MEXICO—5LG was on but 3 days but turned in a good report.

CANADA

February has been a great DX month in the Dominion. 1DD and 1AR have had contact with many foreign countries, including Morocco and Persia and all the near European countries. 3CO has been in contact with WJS in Brazil, and 9AL in the first three weeks of February established contact 13 times with English stations, as well as working the west coast on several occasions. 3NI also made his first English contact with a total input of 40 watts.

The DX bug has been still further in effect, due to the holding of initiations into the "Royal Order of Transatlantic Brass Pounders" in the cities of Montreal and Toronto. In Montreal seven men were initiated and in Toronto five, the latter including 3BQ and 3NF, who were in Toronto for the occasion.

The weekly work of the Canadian divisions on Wednesday nights on 125 meters continues to be highly successful, trans-Canada work being effected regularly on these nights without any difficulty, and new stations making their appearance on the air on this wave every week. In fact the success of these tests has been so great that an additional series of tests has been arranged for a daylight chain of a similar kind. In this case the wave-lengths used are in the 40 meter band and the time is Sunday mornings at 11 o'clock, eastern standard time. All Canadians are hereby cordially invited to participate in these tests. As soon as a sufficient number are operating on this wave, schedule arrangements will be made for further tests at a fixed time on the 20 meter band.

The division managers elections in the Ontarion, Winnipeg and Quebec divisions, have been concluded. In the Quebec divison J. V. Argyle was re-elected, without the necessity of balloting, by an acclamation. In the Winnipeg division, J. E. Brickett, 4HH, of Moose Jaw, has been re-elected by a large plurality. In the Ontario division, Mr. Langford, the retiring manager, was not standing for re-election, and in the resultant close fight, Mr. W. M. Sutton, 3NI, 355 Dufferin St., Port Arthur, Ont., Canada, was elected. Ontario members are hereby requested and notified that all reports should be sent in to their A.D.M's and C.M's before the 15th inst., so that there will be no delay in getting reports in to Headquarters for publication in QST. Further instructons will be sent to them by the new division manager.

It is with great regret that the Canadian General Manager reports the resignation from the the office of division manager from the Vancouver division, Mr. A. J. Ober, who finds himself unable to carry on, due to press of business. Ballots have been sent out to all members of the Vancouver division asking for their choice of a new man, and by the time this is in print there will be a new division manager in office in the Vancouver division also. Included in the ballot sent to the Vancouver division was a request for a vote as to whether to change the name of the division or not.

MARITIME DIVISION
W. C. Borrett, Mgr.

Another convention of the Maritime Division will be history by the time this is in print. We hope the gang will go home full of enthusiasm ready to make an effort to win the Murphy cup and make Old Joe Fassett work hard to keep it. Anyone who can take the cup from Joe will have to go some. Joe was awarded the cup for his all around good DX and to commemorate the fact that he was the First Canadian to work New Zealand. Although 1AR has a shining record, during the next year he will not have it all his own way. The progress made by many new stations in the division is nothing short of marvellous. New Brunswick deserves special mention for now one can hear better from NB station on the air than elsewhere in the division. Credit must be given to 1EI for the way NB has been organized and progressed under his guidance. 1AF heads the list this month and has qualified for a ROTAB by working four European countries. 1AI has progressed most in the last year. With 9 watts input he has worked as far west as the Canadian 4th district and qualified for the ROTAB by working G2NM. 1AM of Fredricton, N. B., has handled some traffic. 1AN the other Fredricton station, is QSO most of this continent and has British 2NB to his credit. 1AK, with spark coil 1CW, is perking and has worked into the 9th district. 1AB has a good D.C. note. He is on for regular Wednesday night tests. 1DU has broken forth and is on to work the gang regularly. 1EI has the loudest signal that we hear from NB and has qualified for the ROTAB by working F8GO. The gang are sorry to hear that 1BO has been sick but glad to know that he is on the road to recovery and coming back strong. All these stations can be

found Wednesday nights at 1.30 A.S.T. on our special Canadian wave-lengeth of 125 meters. They are on 85 meters during the early part of the evenings. 1CO has worked all over the U.S.A. and Canada and should soon be numbered with the ROTABS. 1ED is the second Cape Breton station to establish communication with Newfoundland. He is on consistently handling traffic. 1AE of Glace Bay is also handling some traffic. 1AW is recovering from illness. He operates occasionally. He worked across the Pond. Halifax still has a few of the old gang. 1DT is in commercial radio in the West Indies. 1DF has gone to sea. 1BV is traveling for Senatoire Marconi. Among those still left of the old gang are: 1BQ, 1AR, 1DD, 1DQ, 1DJ and 1EB. 1AO and 1AA are two new Halifax stations. 1BQ was heard working Sweden one night and then he turned around and worked Vancouver, B. C. 1AR has added FAIN in Morocco to his long list of DX stations worked. 1DQ is spending much time at his set and is usually on after midnight. 1EB has added Denmark to his European list. He is at present tuning his set for broadcasting our banquet. With Landry of old 1OAR, he deserves much credit for the success of the affairs as operator and announcer respectively. 1DD has worked all districts, Canada and GHH at Mosul, North of Bagdad, ASIA. A nice bit of Eastern DX say all the gang. He is looking for a Chinese or Japanese station to bob up to complete the work around the world. Campbell lost his mast this month but he is now back stronger than ever. He is new C.M. for Halifax, taking the place of 1EF who is leaving us. When this report is in the hands of the gang, the D.M. will be on his way to Paris, where he will represent Canada along with other Canadian delegates who may go. During his absence Mr. Elliott Campbell, 1DJ, 92 Beech St., Halifax, will act in his place and all A.D.M's, D.S's and other stations not under an A.D.M. or D.S. will please make their April report to him by April 25th at the latest. The D.M. has made arrangements with F8CZ, G2OD and G2NM to work from their stations and all Maritime stations are asked to keep a special lookout for these European stations during April.

C8AR at St. Johns, Newfoundland, has gotten down to 135 meters, and is QSO the rest of the division. All stations are asked to keep a special lookout for him and work him. He is the first Newfoundlander to appear on the air and will be very useful for Transatlantic work during the summer months.

Traffic: 1AR, 23; 1AF, 26; 1AM, 5; 1AN, 5; 1AK, 9; 1AB, 8; 1AE, 6; 1AW, 4; 1DD, 9; 1DJ, 5.

ONTARIO DIVISION
Wm. M. Sutton, Mgr.

CENTRAL ONTARIO — 3KP has lost his fifty. 3ZB is changing his location. 3KA is installing a 50. 3DH is QSO Porto Rico with 10 watts. New silent periods are putting a crimp in the traffic. 3HI has been slipping the traffic through Listowel. 3CO has completely rebuilt his station and increased power. 3VH, our O.B.S., was the victim of an unfortunate accident. A young iceberg slid off the roof onto his counterpoise, the weight pulled his transmitter to the floor. However, he was copied solid in Buenos Aires sending a QST. 9BJ has rebuilt and is now QSO C5GO. Toronto is QSO Europe and the gang are leaving no stone unturned to become members of the R O T A B's.

Traffic: 3HI, 62; 3DH, 6; 3ZD, 5; 3MV, 4; 3GK, 6; 3PZ, 8; 3VH, 10; 3LY, 15; 3KQ, 30; 9AL, 61; 3PH, 11; 9BJ, 103; 3FC, 27; 3CK, 21.

QUEBEC DIVISION
J. V. Argyle, Mgr.

Connections across and with all parts of this Continent remain very good, and especially worth comment is the fact that several stations have been directly QSO Vancouver. No one has yet worked New Zealand or the Aussies, though 2BE, 2AX and 2CG have roused themselves in the dim mornings occasionally to try to put this thing over. Thurday morning 125 meter work across Canada continues to be eagerly looked forward to and connections are verw smooth. Friendships are being formed everywhere along this route and letters follow communication over the air. Those of you in Quebec not participating in this work are missing the best thing Canada is doing. Sunday, 11 A.M. work on 40 meters, is progressing. With inputs of 2 watts Halifax, Montreal and Toronto are linked. We hope to have more stations in on the fun soon. Slackening of activity in big DX has been made up for more traffic and much better reporting of activity. 2DO and 2AX are now Official Relay Stations. 2FI is off for a while due to the dissipated filament disease. 2BG is on more lately. 2CI is on 125 meters and has schedules on that wave-length. 2BE concentrated with 2CG and 2AX on early morning stuff. 2FO continues to increase power and DX. 2HV has worked G2NM. Following are newly enrolled ROTAB'S: 2BE, 2BN, 2BG, 2CG, 2AX, 2AZ and 2HV. 2BE says his cellar was a wreck. The path of QRM was not an easy one to tread. C9AL paid us a visit and was welcomed by the gang at 2BE. He visited some of our stations and believe his main impression was that we're a tough bunch.

Traffic: 2CI, 15; 2BE, 23; 2AV, 17; 2BG, 27; 2AZ, 4; 2BN, 10; 2CG, 15.

VANCOUVER DIVISION
A. J. Ober, Mgr.

VANCOUVER—The Vancouver district has settled into its stride now and traffic is moving reliably in all directions except into Calgary, where there is practically only one station to receive traffic. The 125 meter relay is working fairly good, as there has been a lot of interference from the telephone alternators and power leaks. Besides, the local club meets every Wednesday night and the gang doesn't get down to business until near midnight. 5AN operates doing work on 40 meters; he has a schedule with 6AR. 5GO has put in a 250 bottle and is connecting regularly with the antipodes. 5BA continues in good contact with NZ and has installed a 50. 5HS came back on 75 meters and got QSO NZ. That's the stuff, OM! 5DS-5CU continue to do consistent traffic handling, being on the air every night. 5HB's big set fell through for the time being. He has a 50 watter working on 80 meters and has a nightly schedule with Seattle. 5GF has been experimenting with a 5 meter jigger, ill-treating a V24 with 300 volts on the plate. The street cars are the best DX and are very QSA. 125 meters is working very well and he is helping to hold down the Pacific end of the trans-Canada relay.

Traffic: 5GO, 68; 5DS, 43; 5AN, 22; 5BA, 18; 5GF, 16; 5CR, 6; 5BJ, 4; 5HB, 3; 5HS, 3; 5HP, 3; 5AF, 2.

NEW WESTMINSTER — 5BJ chalks another month to the credit of his ancient fiver. He sent a message to C1EI via 125 meter route and received a reply in 20 minutes, the message was relayed through C3NI. 5CR and 5AF have managed to persuade their sticks to stand up on end without coming down. 5HC is a new station QRV for traffic. He celebrated his coming by working NZ right off the bat. (FB, OM—A.D.M.) 5HG sez he needs a rest. 5AS will be off for a while. 5BZ is rebuilding after making a good record. 4IO reports not much traffic handled. We wonder if he knows he has been logged in France. Three cheers for old "Bill." Along comes 4GT, a 250 watt station, and sez he has been logged in Sidney—input was 66 watts. 4GT is one of those early morning birds and if you have any traffic for Calgary you will have to get up early. 4DQ is on the air most every morning from 7 to 9 A.M., M.S.T., and works into 6th and 7th district. The O.W. is the chief operator, as the Om. is too busy with work. 4DQ has logged four Aussies and G2NM in broad daylight with sun up, 1stage and 1BFG tuner. 4AB is on 100 meters, using 10 watts, and is getting out in great shape. He is QRV for traffic west.

EDMONTON — 4JF is stepping out FB, working east and west easily, although hampered by an extremely bad location. 4JF is a reliable relay station, his QRH 125 meters. 4AH is getting out ok with his 10 watts, having worked several sevens. His QSB is the best in Edmonton and causes no QRM whatever; his QRH 80 meters. 4SB is on practically every night, the operator is Mr. Pike, who is instructor of radio at the Edmonton Technical School. 4HF is on twice a week and works Winnipeg any time.

Traffic: 4JF, 5.

VANCOUVER ISLAND—5CT is still the mainstay. He has worked all Canadian district, all U.S., except 3rd and 4th, this is what you might say reaching out on a fiver. FB, OM!—D.M. 5AW has logged Z4AK on one tube and got him FB working 6CGO. Great logging, OM, and hope to hear that transmitter of yours soon. He took a ham's advice and now sez A.R.R.L. forever. 5AW is what you might call a real northern station, up where the static shoots from the end of your nose to the first dial on the left.

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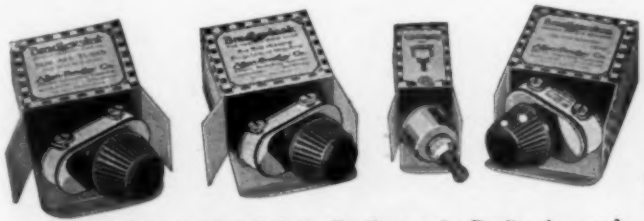

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